

The Mining Journal

LONDON, JULY 25, 1958

Vol. 251. No. 6414.

Price Ninepence



A set of three AR-L compressors, skid-mounted with diesel drive, being installed at one of the mines of the Union Minière du Haut Katanga, in the Belgian Congo.

For hard
3-shift
running
but easy
installation!

SPECIALY DESIGNED TO OPERATE where cooling water is scarce are the Atlas Copco AR-L compressors. They are absolutely self-contained, with a closed-circuit cooling system. Normally they are skid-mounted and complete with electric motors, but—as in the instance shown above—they can be operated by diesel engine. These AR-L compressors are easy to install; no concrete foundations are needed, nor any permanent water supply.

Portability plus highest efficiency

Atlas Copco AR-L compressors combine the advantages of water-cooled machines, high efficiency and low discharge air

temperature, with those of air-cooled models, easy installation and maintenance. They are cooled by a fan-cooled inter-cooler and a radiator for the cylinder water. The complete cooling system is a part of the compressor unit, entirely self-contained.

DATA ON AR-L COMPRESSORS

Type	Maximum pressure in psi	Speed in rpm	Capacity in cfm at 100 psi	Power required at 100 psi in hp	Total weight in lbs.
AR1L	125	730	381	80	2,900
AR3L	125	585	646	130	5,300

A complete range of compressed air equipment

Atlas Copco manufactures portable and stationary compressors, rock-drilling equipment, loaders, pneumatic tools and paint-spraying equipment. Sold and serviced by companies or agents in ninety countries throughout the world.

Atlas Copco PUTS COMPRESSED AIR TO WORK FOR THE WORLD

Contact your local company or agent or write to Atlas Copco AB, Stockholm 1, Sweden



INCREASE MAN-HOUR EFFICIENCY UNDERGROUND WITH **SPIRATUBE**

— Pressure or Exhaust Systems —

Keep workers fit and fresh with a constant flow of clean, invigorating air. No need for unwieldy permanent ducting. Use Spiratube. It can be installed quickly and easily. Economical too . . . because Spiratube can be used many times. Just unhook it from the traveller wire. Retract it into manageable lengths. *(It's light enough to carry.)** Move it to the new site. Hang it — and efficient ventilation is immediately ready. Send to-day for an illustrated technical brochure about this most versatile ducting, with a hundred applications in industry.

** Spiratotes - simple carrying frames - are built for the job. One man can handle 50 feet of 18" ducting easily.*

FLEXIBLE DUCTING LIMITED

89, SHUNA STREET, MARYHILL, GLASGOW. N.W.

Telephone: MARYhill 3729.

Telegrams: FLEXIDUCT, GLASGOW. N.W.

An associate company of George MacLellan & Co. Ltd., Established 1870.

The Kota loading device, with its working range of 15 sq.m. from a single suspension point and its ability to operate over rough surfaces, opens up new horizons in the mechanization of mining. The Kota can be put to work quickly as the initial installation can be carried out in less than 20 minutes.

The Kota is of simple construction and is, therefore, easy to maintain. Yet it is strong—robust—and, weighing only 440 lbs., can be moved without difficulty.

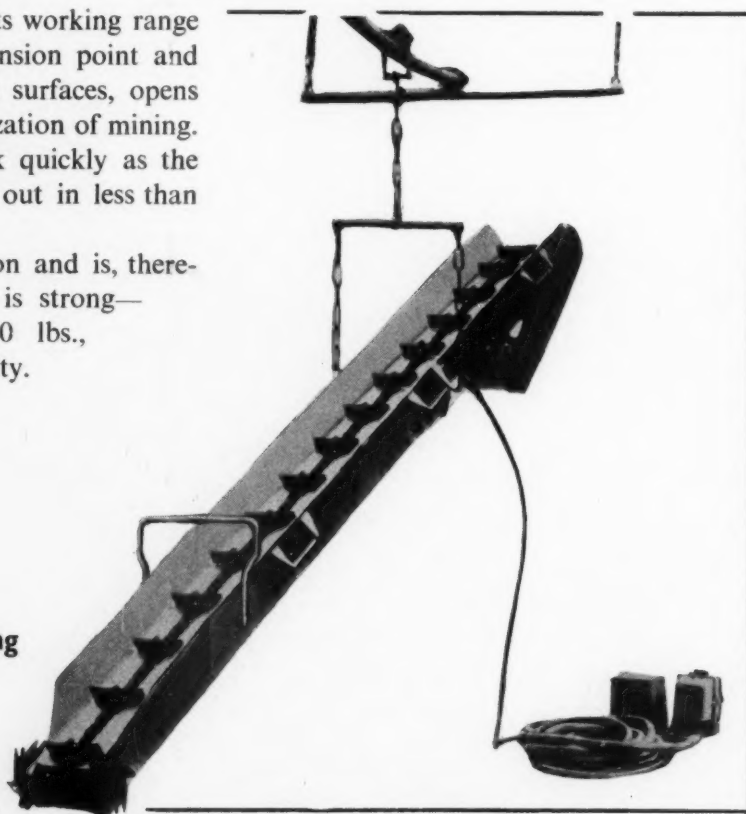
The Kota loading device is adapted advantageously for colliery work, where it is economic and widely used.

Exported by:

NIKEX Hungarian Foreign Trading Company for the Products of Heavy Industry.

Budapest 4, POB. 103.

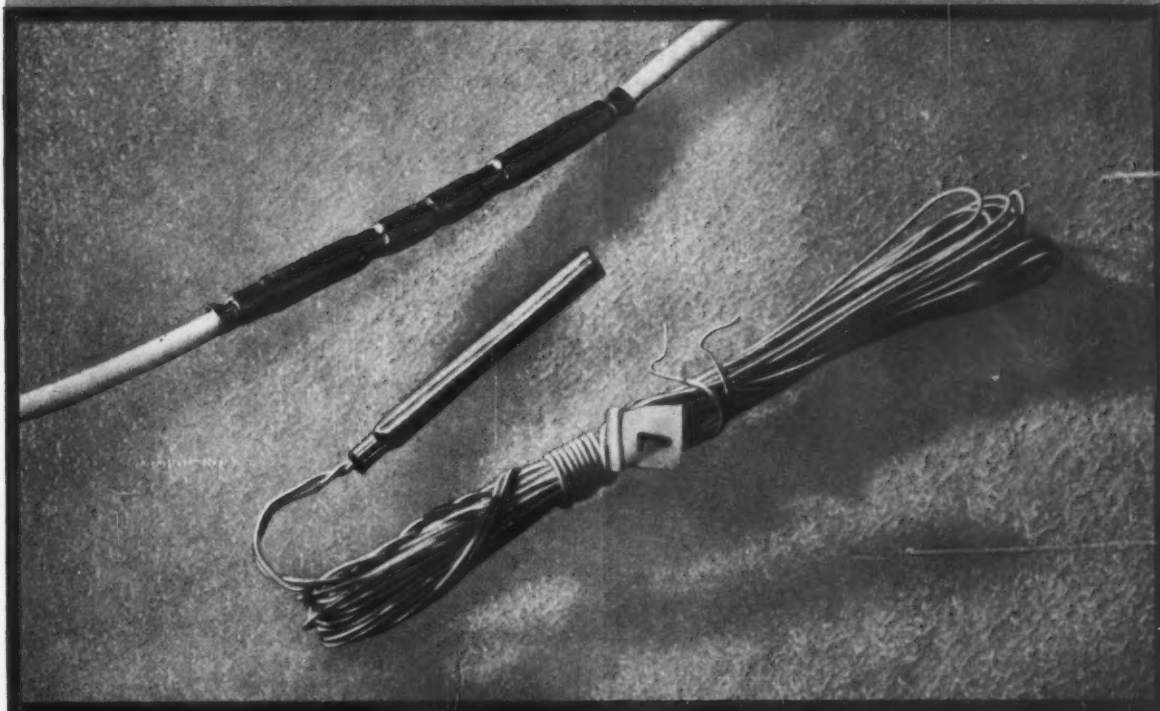
Cables: NIKEXPORT.



PRECISION INSTRUMENTS

for Short Delay Blasting

Today, the most modern quarry blasting technique is Short Delay Blasting. The precision instruments that make Short Delay Blasting so efficient are I.C.I.'s Short Delay Detonators and Detonating Relays. They produce rapid-sequence explosions which release energy scientifically where it counts most. With delay intervals measured in milliseconds, Short Delay Detonators and Detonating Relays effectively reduce ground vibration and, therefore, larger blasts are possible. In addition, improved rock fragmentation results in easier loading. I.C.I. Short Delay Detonators and Detonating Relays play an important part in modern quarrying.



FOR MAXIMUM EFFICIENCY WITH MINIMUM VIBRATION

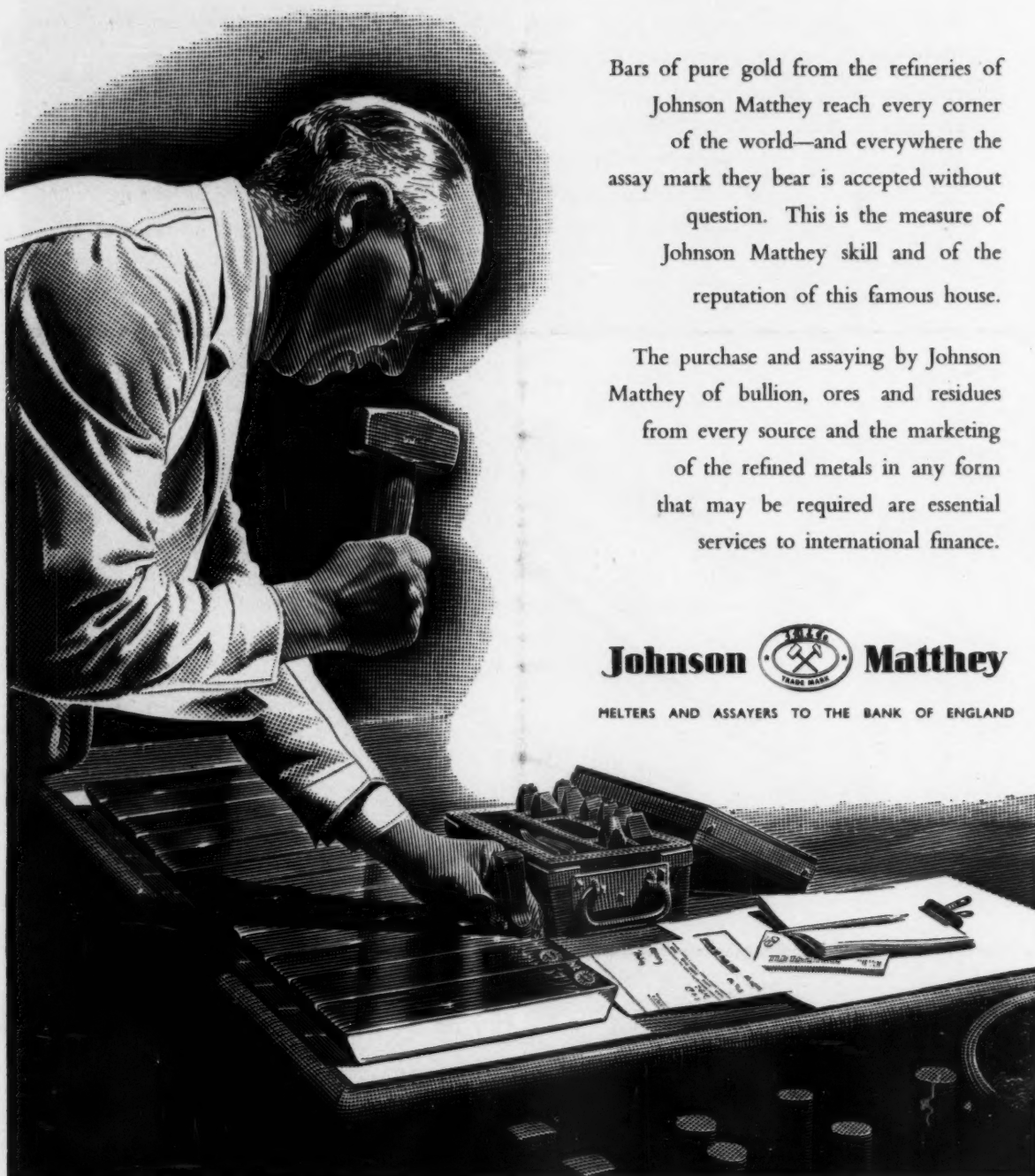
Use I.C.I. Short Delay Detonators or Detonating Relays



For further information, consult:

IMPERIAL CHEMICAL INDUSTRIES LIMITED, LONDON, S.W.1

Accepted throughout the world...



Bars of pure gold from the refineries of Johnson Matthey reach every corner of the world—and everywhere the assay mark they bear is accepted without question. This is the measure of Johnson Matthey skill and of the reputation of this famous house.

The purchase and assaying by Johnson Matthey of bullion, ores and residues from every source and the marketing of the refined metals in any form that may be required are essential services to international finance.

Johnson  Matthey

MELTERS AND ASSAYERS TO THE BANK OF ENGLAND

JOHNSON, MATTHEY & CO., LIMITED • HATTON GARDEN • LONDON • E.C.1

Telephone: Holborn 6989

Tough

GOODYEAR HAND-BUILT HOSE for every suction job

Long service in exacting conditions has time and again proved the superiority of Goodyear Hand-built Hose for suction and discharge duties whether it be water, chemicals, foods, beverages, sand or gravel. Skilfully designed and constructed, the hose has multiple plies of high-strength closely-woven fabric with a helix of round steel wire to provide reinforcement against collapse and crushing. Most types can be supplied in any length up to 60 feet.

Whatever the service, Goodyear Hand-built Hose is first choice for tough, long-lasting, low-cost operation.



Goodyear Water Suction and Discharge Hose is manufactured in three types—with smooth-bore and fully embedded reinforcement for heavy duty service, especially when the water is corrosive, with rough bore for general service, and with semi-embedded wire for heavy duty applications.

GOODYEAR

Industrial Rubber Products



TRANSMISSION & CONVEYOR BELTING • V-BELTS • HOSE • FENDERS

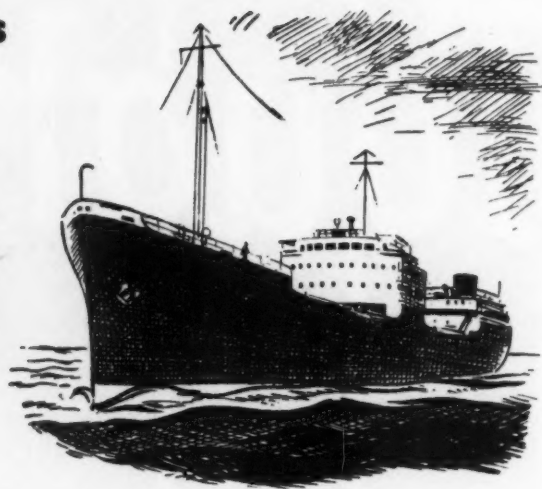
THE GOODYEAR TYRE & RUBBER CO. (G.B.) LTD • INDUSTRIAL RUBBER PRODUCTS DIV • WOLVERHAMPTON

MARKETING:**ORES • MINERALS**

IRON CHROME
MANGANESE
MANGANESE DIOXIDE
MICACEOUS HEMATITE
ILMENITE RUTILE
ZIRCON ETC

FERGUSON WILD

& CO LTD

**SHIPPING:****BROKERS CHARTERERS****15 ST. HELEN'S PLACE • LONDON • EC3**

Cables: FERGUSONIA LONDON • Telex No: GBLN 28001 • Telephone: LONDON WALL 7022 (8 lines)

MINES AND QUARRIES ACT, 1954**The Law relating to Safety and Health**

If you are the owner or manager of a mine or quarry, or a personnel or welfare officer, *at least one* of the volumes listed below is an essential part of your equipment. In the four volumes of this work are contained all the statutory provisions of general application relating to safety and health which came into operation on 1 January 1957, either because of the Act of 1954 continued them in force or because they were made to take effect on that date, when the Act itself became effective.

Volume I *Mines of Coal 14s. (post 10d.)**Volume II *Mines of Stratified Ironstone, Shale, and Fireclay**
13s. (post 9d.)**Volume III *Miscellaneous Mines** 7s. (post 6d.)**Volume IV Quarries** 5s. (post 5d.)**reprinting; ready Mid-August**from the Government Bookshops***H M S O***or through any bookseller*



ore dressing

Since no two ores are exactly alike, it is advisable to carry out sample tests to determine the most suitable dressing process and the degree of crushing required. The Company's mineral dressing laboratories exist to serve the mining industry. Tests by all recognised ore and mineral processes are carried out by qualified staff and recommendations made which enable mining companies to plan the scope of their future operations and decide on suitable equipment.

Publication F. & C. 2284 fully explains this service and is available on request.

G.E.C.

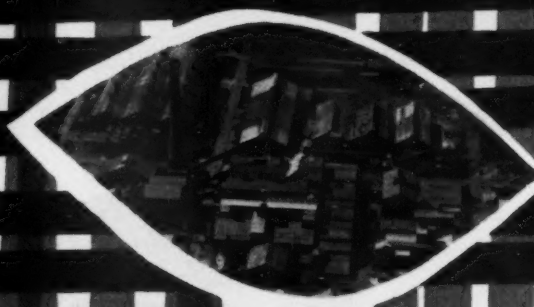
THE GENERAL ELECTRIC CO. LTD. OF ENGLAND • ERITH • KENT

Designers and manufacturers of complete mineral dressing plant

MG274

ores, concentrates and residues
containing

TIN
LEAD
COPPER
BISMUTH
ANTIMONY
GOLD
SILVER



bought by

CAPPER PASS

CAPPER PASS & SON LTD

NORTH FERRIBY

YORKSHIRE ENGLAND

The Mining Journal

London, July 25, 1958

In this issue . . .

Mining Laws Compared	95
Trade with the Communist World	96
In Search of Uranium	97
Prospecting Rights and Mining Leases	98
Canada's Mineral Production May Triple	99
Winning Coal at High Speed	100
Expanding Outlets for Aluminium	102
Copper Alloy Bearings	102
Mining Miscellany	103
Machinery and Equipment	104
Metals and Minerals	106
London Metal and Ore Prices	106
Mining Finance	109
Company Meetings	110

Vol. 251

No. 6414

Established 1835

Editor

U. Baliol Scott

Deputy Editor

A. Graham Thomson

Assistant Editor

R. Bowran

Assistant Financial Editor

R. A. Nuttall

Display Advertisement Manager

E. S. Hooper

Circulation

Robert Budd

Published each Friday by

THE MINING JOURNAL LTD.

Directors

E. Baliol Scott
(Chairman)

U. Baliol Scott
(Managing)

G. A. Baliol Scott

R. A. Ellefsen

15 WILSON STREET,
LONDON, E.C.2

Telegraphic
Tutwork London

Telephone
MONarch 2567 (3 lines)

Annual Subscription £3

Single copy ninepence

Mining Laws Compared

THE Regional Conference on Mineral Resources Development held under the sponsorship of the United Nations Economic Commission for Asia and the Far East in April, 1953, noted that regulations governing the development of indigenous mineral resources varied from country to country in the region. The Conference formed the opinion that, if these regulations were brought together for careful study by an expert body, such as the Sub-Committee on Mineral Resources, the experts would be benefited by others' experience. In this way they would be in a position to recommend to their governments suitable amendments to existing regulations, while foreign countries and private concerns would have a better idea of the conditions under which they could invest in the region.

In accordance with the Conference's recommendation, a preliminary survey of mining legislation in the Region was submitted to the Sub-Committee on Mineral Resources Development at its second session, held in Tokyo in June, 1956. The Sub-Committee requested that the final survey should take into account not only the legislation of the countries of the region but also that of countries outside the region, and that it should include the following aspects of mining legislation: proprietary rights in mineral areas; prospecting and mining licences, mining leases and methods of control over their issuance; government supervision over mining operations; government revenue from exploitation of mineral resources; safety and sanitary rules and regulations; and, finally, foreign investments in the exploitation of mineral resources.

It was further suggested that the survey should include drafts of model laws on different aspects of mining legislation suitable for adoption by highly developed countries, as well as by under-developed countries which have recently embarked upon a programme to exploit their mineral resources. This important survey has been completed and the report has been published by the United Nations as *Mineral Resources Development Series No. 9*. It does not deal with rules on safety and sanitation, on which material will be supplied to the Sub-Committee separately by the International Labour Organization, nor have model legislative provisions been included.

The world-wide search for minerals has brought about profound changes in the attitudes of many countries towards the mining industry. In the first place the helicopter, together with the ubiquitous jeep and Land Rover, have enabled prospectors and mining companies to penetrate into territories which are remote or difficult of access, often bringing primitive peoples almost their first direct contact with Western progress. In many of the less highly developed countries there is today a growing desire to participate in the material benefits which science and technology have brought to the industrial nations. Many governments have accordingly embarked on ambitious long-term programmes aimed at raising living standards in the shortest possible time.

It is also becoming more widely realized that planned development of industry requires to be based primarily on the exploitation of indigenous resources. In a growing number of countries

attention is therefore being directed to the possibilities of processing minerals which have hitherto been produced only for export in raw form. This, of course, is a trail which has already been blazed with conspicuous success in various countries, of which South Africa and Australia were the earliest notable examples.

Another factor to be taken into account in framing mining legislation is the present tendency—by no means confined to the ECAFE countries—to regard the right to exploit minerals as being separate from ownership rights in land, only the State being empowered to authorize the extraction of minerals. State ownership of mineral resources is declared in the constitution and mining laws of some countries. In others, the right to exploit minerals belongs only to the State.

The mineral legislation surveyed by the United Nations Office of Legal Affairs is largely concerned with the conditions under which private persons or companies may acquire and retain exploration and exploitation rights. In framing their systems of permits, licences, leases and conditions, governments are understandably anxious that the State should derive the maximum possible benefit from the exploitation of mineral resources. On the other hand, countries wishing to develop their mining industries cannot afford to ignore the world shortage of capital and technical skill. For those with money to invest abroad there is no lack of opportunities. Other considerations being equal, the investor will choose a country which offers him attractive inducements coupled with reasonable protection against the possibility of nationalization.

One respect in which other considerations are ceasing to be at all equal concerns, of course, the political expediency for the Great Powers to channel investment into the economically underdeveloped and politically still uncommitted areas of the world, of which the ECAFE region is perhaps the prime example. Investment of this kind, whether directly by government or through private channels underwritten by government, must be less concerned with the strictly financial merits of the project but may well carry other politico-economic strings of considerably greater importance alike to the lender and the borrower. Indeed, these are among the initial moves in the successful deployment of the offensive in each new theatre of the cold war.

On the other hand, governments which have been inclined to keep too much for the State, are being compelled to think again no less than are foreign investors whose rate of earnings has become vulnerable to hostile propaganda. The Philippine Republic, for example, received no response to its call for bids to mine and process the extensive nickeliferous deposits in the Surigao Mineral Reservation, and is now changing the mining law in order that a new invitation may be issued under more favourable terms. Ghana, despite the safeguard against nationalization which has been written into its constitution, is still striving without much tangible success to finance the Volta River aluminium scheme, although the rapid growth of world aluminium capacity is doubtless the major factor here.

While it must be recognized that the State will probably tend to exercise greater control over the exploitation of minerals than in the past, and in one way or another will seek a larger share in the proceeds thereof, the growing competition for capital—which seems likely to become progressively scarcer—should become an increasingly effective safeguard against exploitation of the investor by the State.

Meanwhile, those responsible for the drafting of mineral legislation have difficulty in steering a fair course between the varied and often conflicting requirements of their complex task. That several countries have recently found it expedient to make drastic revision of their mining law underlines the value of the U.N. survey, which might, with

advantage, be studied whenever new legislation is proposed. The first of three articles summarizing this important report will be found on page 98.

A substantial section of the report is devoted to legislation as it affects petroleum. This is omitted from our summary.

TRADE WITH THE COMMUNIST WORLD

On July 1 it was reported that the Allied nations had agreed to slash curbs on strategic trade with Communist countries by nearly 40 per cent, about 80 items being involved. At the same time, the 15 allies decided to revise the basic rules of their system regulating trade between East and West.

The revision is to be finalized by the end of this month, when the scope of the promised reductions should be known. No public announcement may be made in Paris, but individual governments will be free to reveal the main amendments. Meanwhile, allied experts are redefining standards of what constitutes "strategic" goods and materials in the light of new evidence of Soviet scientific and industrial advances.

The present studies were started some three months ago in Paris by a body known as the Consultative Group, comprising all the Atlantic pact powers, minus Iceland but plus Japan. This group adjusts, co-ordinates and supervises trade with the Communist bloc. Britain, France, West Germany and Japan have for some time been pressing for more sweeping relaxation in the hope of exporting more goods to Communist markets—a prospect which is particularly attractive at the present time as a counter to the possible effects of the U.S. recession on Free World trade.

American agreement to a further relaxation of embargoes implies acceptance of arguments by the industrial nations of Europe that new strategic concepts have altered military needs, and that the Communist powers now possess many secrets of know-how which were formerly barred to them.

The Consultative Group has three master lists of controlled goods and materials, all of which have been subject to revision. The first, which consists of about 200 items totally embargoed for export to Communist countries, has been cut by nearly 40 per cent. The second list comprises goods and materials which can be sold only in limited quantities to prevent Communist stockpiling. The third contains items which are subject to supervision in case stockpiling is taking place. Both the second and third lists have also been reduced.

In general, the goods to be freed from controls include chemicals, industrial and agricultural equipment, motor cars and trucks, certain types of metals, electronic items and machine tools. Within these general categories fall many items of machinery and equipment used in the mining industry which have been embargoed for export to Communist countries because of their potential usefulness for warlike purposes.

It is, of course, virtually impossible in many instances to formulate a rational division between equipment of military and of purely industrial value. An outstanding example of the absurdities which can result from the arbitrary restriction of exports on strategic grounds has been our inability to take advantage of China's need for tractors—thus depriving ourselves of an export market which is reputedly extremely large. Similarly, mining drilling equipment to Russia has been embargoed where it can be shown to have an alternative petroleum application. Moreover,

the obvious consequence of banning exports of machinery and equipment to countries with such vast resources as China and Russia is to give a further stimulus to the development of local manufacture. The same is true of the embargo on metals. In this respect, as well as in depriving ourselves of future markets, the embargoes may be hurting the Western powers far more than the Communists.

The relaxations are expected to result in a considerable expansion of trade between Western Europe and the Communist bloc. It is impossible at this stage to assess the potential benefits to exporters of mining machinery and equipment, but it may be assumed that the effect will be to open up potential markets for quite a number of items at present embargoed. It has also to be seen what new openings will be presented by the relaxations in regard to metals, a point of particular interest being how far the revised list will go towards satisfying Chile's agitation for increased latitude in the export of copper and copper wire to the Communist world.

IN SEARCH OF URANIUM

The part played by the Atomic Energy Division of the Geological Survey in the search for uranium is little known because of the security measures that have applied until comparatively recently to information on the production of nuclear raw materials.

The Division, which is the youngest branch of the oldest organization now in the Department of Scientific and Industrial Research—the Geological Survey of Great Britain—was created during the Second World War to investigate the exploitation and supply of uranium and other strategic materials. Since that time it has played an important part in bringing uranium properties into production, and in organizing and stimulating the search for the raw materials of atomic energy in many of the countries of the Commonwealth. Close co-operation is maintained between the Division and the Atomic Energy Authority, on whose behalf the work is undertaken.

The Atomic Energy Division has grown to be a major branch of the Geological Survey, and the assistance it can give ranges from radiometric assaying and the preparation of mineralogical reports to field surveys and the assessment of new discoveries of mineralization made by prospectors and mining companies. For example, in 1957 field investigations were carried out in the Union of South Africa, British Guiana, Jamaica, Sierra Leone, Bechuanaland, Ghana, Nigeria, Nyasaland, Southern Rhodesia and New Zealand, in addition to field work in Britain.

Last year, the Atomic Energy Division of the Geological Survey, acting on behalf of the Atomic Energy Authority, undertook an airborne radiometric survey of West and Central Cornwall. Results of this survey have so far been interesting. Several of the anomalies recorded are sufficiently marked at surface to merit pitting, trenching and exploratory drilling to prove the extent of the mineralization underground. The area to be covered by airborne survey will be extended this year to cover the remainder of Cornwall, and much of Devon and Somerset. Any areas which seem to justify closer examination will be investigated by ground parties equipped with portable scintillation and Geiger-Muller counters.

In addition to this air reconnaissance survey, the Division is undertaking the examination of abandoned mine workings in Cornwall where small amounts of uranium are known to occur. Only surface, or near surface, examination has hitherto been possible but reconnaissance drilling

has recently started and will continue on an increased scale during the summer season. The Division may later expand its survey to cover other areas in which uranium mineralization might occur; for example, such areas as North and Central Wales, North England and the Southern Uplands of Scotland.

Field work of this type is of little value without research facilities behind it. Radioactive mineral specimens found in the field—either by the Geological Survey's own geologists, by other geological surveys, by mining companies or by private prospectors—are studied by the latest techniques, some of which have been developed by members of the Division.

An indication of the complexity of the work undertaken may be obtained from the fact that there are over a hundred known uranium-bearing minerals and over fifty thorium-bearing minerals. Thousands of samples are normally examined annually and, at the same time, a research programme is maintained which has enabled the Division to make a considerable contribution to radiogeology in papers published, from time to time, in the *Bulletin of the Geological Survey* and other scientific journals. Studies of world-wide importance have been made in the fields of mineralogy and ore genesis, autoradiograph techniques, ore mineral identification and the examination of radioactive minerals by X-ray methods.

To mining companies and private prospectors, including members of the public, the Division provides on behalf of the Atomic Energy Authority, a free assay service for material which is considered to be radioactive. The only proviso in accepting material is that full details of locality must be given. This information is, of course, treated as confidential.

When specimens are received they are examined first by a specially constructed Geiger-counter which gives a rough indication of whether or not the material is abnormally radioactive. If the latter, representative portions of the specimens are crushed for accurate assay by radiometric techniques and the content of uranium or thorium estimated. Sections from the specimens are then cut by diamond saw and mounted for examination under the microscope.

The sections of relatively transparent minerals obtained are mounted on glass slides and rubbed down till they are about a thousandth of an inch thick; those of the more opaque species are examined by reflected light after polishing. Usually, the minerals comprising the specimen can be identified in this way, but it may be necessary to remove minute fragments of any undetermined mineral for examination by X-ray diffraction.

Examination of the photographs obtained by this latter technique show that they are characteristic of the particular mineral species. When radioactive minerals are exposed on special emulsions, similar to those used on photograph plates, they produce an image or autoradiograph on development. Use is made of this phenomenon in the location of radioactive mineral grains and in their identification. Associated non-radioactive minerals in the specimens must also be identified, as the nature of these to a large extent dictates the technique that may have to be employed later in completing the extraction of the uranium or thorium.

The end-product of such an investigation is a report on each specimen or group of specimens submitted. This gives details of the uranium or thorium content and the nature of the minerals contributing to the radioactivity, with their grain size, and distribution in relation to the associated non-radioactive minerals. Attention is also paid in such reports to specific problems, such as the bearing of the mineralogical observations on difficulties that may be encountered in treating material of ore grade.

*Mining Legislation in
Asia and the Far East—I.*

Prospecting Rights and Mining Leases

FOLLOWING the Regional Conference on Mineral Resources Development held under the sponsorship of the U.N. Economic Commission for Asia and the Far East, in Tokyo, in 1953, a United Nations Survey has been prepared covering mining legislation, not only in the countries in the ECAFE region, but also in respect of certain countries outside this area. It covers the following aspects of the subject: proprietary rights in mineral areas; prospecting and mining licences, mining leases and methods of control over their issuance; government supervision over mining operation; government revenue from exploitation of mineral resources; and foreign investments in the exploitation of mineral resources. The latter aspect is dealt with only briefly, an earlier report on this subject having already been made.

In most of the countries surveyed the right to exploit minerals is separate from ownership rights in the land and only the state may authorise the extraction of minerals. Petroleum and radio-active mineral operations are usually governed by separate legislation. One section of the report which deals with petroleum is not reviewed in this series.

The ECAFE Region

Burma. Under existing law all minerals are to be exploited by the government, but Parliament can grant 25-year rights to Burmese nationals or to companies, at least 60 per cent of whose capital is Burmese owned. The Government-owned Mineral Resources Development Corporation has to obtain approval before associating with private enterprise. Prospecting licence deposit is Rs. 500 per sq. mile. Mining leases are restricted to 15 sq. miles in area and to 20 years without renewal. Special rules apply to certain tin and wolfram bearing areas suitable for surface mining. New laws are being considered.

Ceylon. Yearly, extendable prospecting licences are granted in Ceylon. A renewable 15-year mining lease may be granted to the holder of a prospecting licence or to the successful tenderer for lands known to contain minerals. A security deposit is payable on all mining leases.

China. Up to 2-year prospecting and up to 20-year extendible operating rights can be acquired over areas not reserved for state exploitation. Private citizens and foreign nationals may provide capital toward state-operated mines. A state-operated mining right may be leased to private persons. Aliens may become shareholders in private mining development companies, subject to prior government approval.

Hong Kong. Single, six-monthly, renewable, non-transferable prospecting licences and mining licences are issued in Hong Kong in respect of non-restricted areas. Up to 21-year, renewable mining leases may be granted. Longer periods require special approval.

India. Applicants for a prospecting licence or mining lease must hold a provincial government certificate of approval (initial fee Rs. 100, renewal fee Rs. 50). Prospecting licences cost Rs. 50 for the first square mile and Rs. 10 for each additional square mile and can be granted to Indian nationals by provincial governments; for others, central government approval is necessary. Apart from mica, licences are for two years and are renewable. A mining lease

is granted for all minerals covered by a prospecting licence and the fee is Rs. 200. Renewable leases are for 20 or 30 years according to the mineral, but shorter periods can be applied for.

Indonesia. Normally, a prospecting licence covers an area limited to 10,000 hectares, and, after three years, can be twice renewed for yearly periods. Certain areas are state-reserved or otherwise closed. Mining concessions are granted only for certain listed minerals. The maximum area is usually 1,000 hectares and the term is 75 years, renewable under conditions.

Japan. Mining rights, both for prospecting and digging are issued to Japanese nationals for two years, renewable only twice for a period of two years each time. Foreigners are subject to special arrangements. Renewable mining leases are granted for the mining of specific minerals for five years.

Korea (Southern). Up to 25-year mining rights are issued only to Korean nationals; companies incorporated under the laws of the Republic, in which more than half the capital and voting rights belong to Korean nationals; and specially authorized foreigners or foreign companies.

Laos. New mining legislation is being drafted. At present, renewable 5-year mining rights are given by special decree regardless of nationality. A prospecting licence covers 9 sq. km. and is valid for three years. Mining concessions are granted for areas of not less than 100 ha. and not more than 900 ha. and are perpetual.

The Ministry of Planning issued a decree on December 25, 1957, suspending provisionally the acquisition of mineral research rights for certain minerals, and reserving certain areas for research exclusively to the Lao Government subject to prior rights already granted.

The privilege of acquiring exclusive mineral research rights is provisionally suspended throughout the Kingdom for all magnetic substances. Subject to prior rights already acquired, the Royal Government reserves provisionally for itself the right of research for gold or gold-bearing ore throughout the Kingdom, as well as for lead and gold-bearing areas.

According to the Director of Planning, this action was taken in advance of the research to be undertaken by a team of French mineral research technicians furnished to the Lao Government under the French Aid programme.

Malaya. Certain privately owned lands may be prospected without licence. For state lands, prospecting permits and licences are issued, the latter conveying the right to a mining lease. Validity varies but may be extended at discretion. The lessee must begin mining operations within one year from the date of issue.

Pakistan. One year, renewable prospecting licences are issued only to holders of valid certificates of approval for up to 10 sq. miles. Thirty-year, renewable mining leases are also granted only to holders of certificates of approval, usually for up to 5 sq. miles. Operations must begin within a year of the date of the lease.

Philippines. Prospecting may be carried on without licence, except on special mineral land reservations or on lands covered by patented mining claims or where minerals have already been discovered. Claims may be staked, but such locations must be declared within 60 days. Temporary permits are issued prior to a 25-year, renewable lease being

granted. The mining of coal comes under separate legislation.

Sarawak. General or exclusive prospecting licences may be issued. Panning and fossicking licences are also issued. Mining leases are granted for a period not exceeding 21 years.

Thailand. General and exclusive prospecting licences are issued for yearly periods, the latter not exceeding 3,000 rai (1,200 acres) in area. Mining concessions are granted only to prospecting licence holders. The area of a concession may not exceed 100 rai (40 acres) in the case of a lode and 300 rai (120 acres) in the case of alluvial ground. Temporary six-monthly permits are issued prior to the granting of a concession. Private mining is allowed only in southern Thailand between Chumphorn and the Malayan border, other areas being reserved for government exploitation. Gold, oil and coal may not be privately mined.

Viet-Nam (Southern). It is understood that new mining regulations are being prepared. In the meantime, those in force in Indo-China are temporarily applicable. Details regarding prospecting licences and mining leases are not given in the survey.

Countries Outside ECAFE

Among the countries outside ECAFE Brazil and Mexico declare foreign-controlled companies ineligible to hold mining concessions. Turkey requires incorporation under domestic law, while the Belgian Congo, Egypt and Peru allow foreign companies subject to registration requirements.

Except in Peru, permits and licences are required in all the countries for both exploration and exploitation. In Manitoba (Canada) and Victoria (Australia) both rights are combined in a single licence.

In Brazil, Egypt, Mexico and Turkey the exploration permit or licence gives the holder exclusive rights to search for certain minerals within a limited area for a limited time. The general exploration licence of the Belgian Congo gives non-exclusive rights until an exclusive permit is granted following a discovery.

Generally, exploration right holders are precluded by various types of provisions from effective exploitation, though in Mexico exploration licensees may treat and dispose of products acquired from exploration operations.

Exploitation concessions are for a longer term than exploration rights and in Mexico and Peru they are for an indefinite term. Legislation varies as to whether an explorer has a right to exploit his discovery. In the Belgian Congo, the government has full discretion to deny a mining lease to any applicant, including the discoverer. In Brazil and Turkey, the discoverer may, at the government's discretion, be denied exploitation rights, subject to indemnification or compensation. In Egypt, Peru, Manitoba and Victoria explorers may generally follow up a discovery by obtaining a concession or establishing a claim.

In Egypt and Turkey, concessions, other than those to explorers, can be put up for public auction.

Legislation varies in respect of the minerals included under an exploitation concession or lease, which usually accords the right to construct the necessary installations and to treat and dispose of the minerals extracted, though in the Belgian Congo the government claims preferential right to acquire the products of exploitation.

All the laws surveyed in this section make provision for the right to enter and use surface land where necessary for the exercise of exploration or exploitation rights and provide for compensation to private owners and occupants of the land.

Canada's Mineral

Production

May Triple

THE prediction that Canada's mineral production may triple in the next 25 years is made by Dr. John Davis, in a 400-page study for the Royal Commission on economic prospects. Without taking account of possible price changes, the report indicates that minerals may comprise one-third of Canada's exports by 1980 — a rise to \$5,500,000,000 a year from \$1,600,000,000 in 1955. Individual mineral-production increases by 1980 are estimated as follows: Iron ore, 85,000,000 tons a year from 14,600,000 in 1955; nickel, 325,000 tons from 175,000; copper, 550,000 tons from 325,000; zinc, 800,000 from 427,000; lead, 320,000 from 203,000; aluminium, 2,400,000 from 584,000.

A Cloudy Future ?

Nevertheless, the future for the Canadian minerals industries is not regarded as entirely bright. It is forecast that foreign control will increase to 66 per cent in 1980 from 55 per cent in 1955. This trend, together with the fact that many major importers such as the U.S. restrict imports of finished goods, drastically reduce prospects of increasing the processing of Canadian minerals in Canada. Consequently, the Dominion's production might be limited to raw materials.

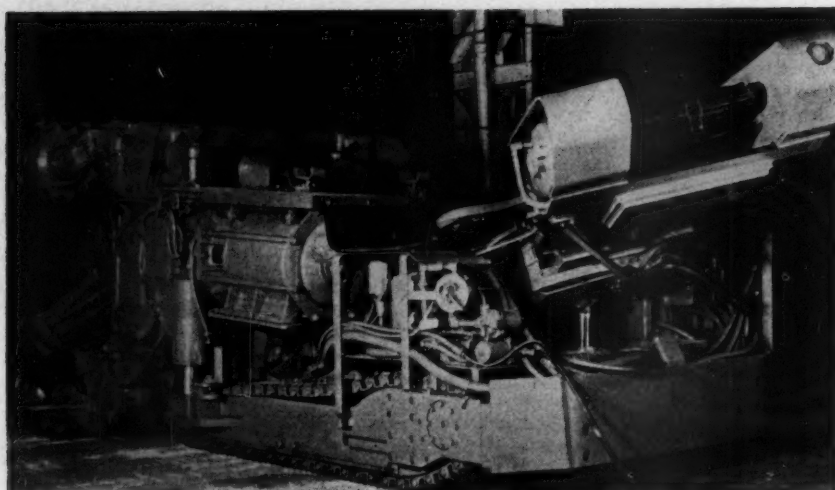
The report's views on uranium are qualified. It is pointed out that as the price falls uranium's usefulness as a source of energy is bound to increase. On the other hand, Canada's domestic uranium requirements by 1980 may be only 2,000 tons a year against a prospective output of 25,000 tons. Outlook for disposal of the balance of the Canadian output is seen as clouded by uncertainty regarding price and tariff factors. It is suspected that the U.S. may give uranium whatever tariff it needs and that costs in some other countries, notably South Africa, may fall below Canada's, since there is no substantial by-product in Canada's uranium ore.

Copper and Asbestos

The most encouraging prospects are seen for copper and asbestos. Only in respect of these two minerals is a continuing upward movement in price envisaged.

Canada has about 40 per cent of the world's asbestos reserves, enough for 56 years; more than 15 per cent of the world's reserves of copper—enough for 45 years at 1955 production rates; 6.2 per cent of the world's iron—enough for 250 years; 23 per cent of the world's lead; 40 per cent of the nickel reserves and 29 per cent of the zinc reserves.

Notwithstanding these substantial reserves, it is emphasized that the search for new metals must be pressed, with the threefold aim of supplying the greatly increased demands for the future as Canada's own and the world's population increases and living standards rise; creating reserves of minerals and metals in which Canada is deficient; and finding sources of metals and minerals not now needed but that may be of increasing importance in the future.



Alongside is shown the Goodman continuous miner, the illustration featuring the discharge conveyor

Winning Coal at High Speed

FOLLOWING a visit to America by a team of its production personnel, the National Coal Board has bought one of the world's most efficient and impressive coal-getting machines, a £50,000 continuous miner which will, it is hoped, win more coal per shift than any coal-getting machine at present operating in Europe.

The machine is known as the Goodman continuous miner, and is manufactured in the United States by the Goodman Manufacturing Co. As sole licensees for Goodman in the United Kingdom, Distington Engineering Co. Ltd. have adapted the machine for use in this country. Several engineers and technicians, working in close collaboration with Goodman, and with Laurence Scott and Electromotors, Ltd., have studied the many problems involved in fitting the machine with all-British Buxton certified flameproof electric equipment.

The machine has recently undergone a series of exhaustive and comprehensive tests at the N.C.B.'s Central Engineering Establishment at Stanhope Bretby, near Burton-on-Trent. The full range of problems involved, including ventilation, roof control, dust suppression and pick setting, was examined under test conditions resembling as closely as possible those which will be encountered in pits. These



Alongside are shown the rotating units which cut into the coal face

trials having been successfully concluded, the machine was delivered to Pentreclwydau Colliery, Area 9, South-Western Division, and will shortly begin coal production.

Cutting Principle

The principle of full-face mining has been brought to the highest point of efficiency yet attained, in this machine. It was developed from the simple idea of using a number of picks on a pair of rotating arms, with a trimming chain to cut the profile.

In American machines this profile can be adjusted to local requirements, but the machine bought by the National Coal Board has been modified to cut only a fixed and predetermined profile, thus facilitating roof support in conformity with British support rules and regulations. Two large cutting arms rotating in opposite directions together with the trimming chain make up the cutting head, all being fitted with extra hard cutting picks. The actual profile cut by the machine is 7 ft. 6 in. high by 13 ft. 6 in. wide. The cutting head is driven by its own electric motor.

The body of the 32-ton miner is mounted on caterpillar tracks, which exert the force necessary to keep the cutting head into the face. A high-speed chain conveyor gathers the coal in front and carries it through the machine, the discharge height being varied according to the conveyance behind. Each track is capable of separate operation, thus giving a high degree of manoeuvrability, and because "grousers" are fitted to the tracks, the machine has worked successfully on gradients up to 1 in 4, either to the rise or to the dip. The low centre of gravity reduces any tendency to dig or climb to a minimum. All movements of the machine, except cutting, are effected by hydraulic motors.

Cutting Speed and Pattern

Cutting speed depends upon the nature of the coal and can vary between 10 and 15 in. per min. The profile gives an output of from three to five tons per min. Several years' experience of the continuous miner in an American colliery have proved that it is capable of producing up to 1,000 tons of coal per shift under varying conditions working round the clock. As with most of these high-capacity machines the output depends on the facility with which the stream of coal carried back from the machine can be handled. This has often proved the weak link in the chain of mining operations from face to main road haulage.

Mention has been made in previous issues of this journal of the specialized equipment which has been developed to cope with the sudden surges of coal from the machine such as mobile extensible belts, and Goodman have developed their own Ropex belt conveyor to be used with the miner, and this is to be employed at Pentreclwydau Colliery.

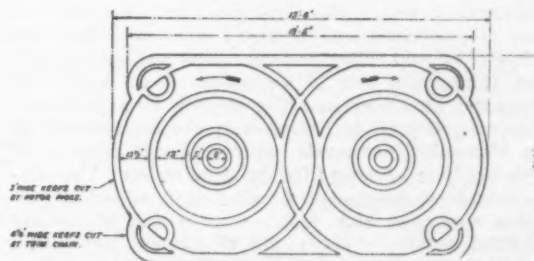
Most of the unprepared coal face is cut and broken by the two rotating units, each equipped with a double-core barrel, two short arms, and two long-hinged arms which lock in the extended positions. Tungsten carbide-tipped cutting picks, mounted on the arms, cut two or three concentric kerfs in the face, a further two kerfs being cut by picks on the core barrel. The shorter arms of the rotor are wedge-shaped, so that the cores between the kerfs are broken out as the machine advances, while each of the longer arms is equipped with a deflector plate.

In conjunction with the forward movement of the machine, this has the effect of directing the cut coal towards the centre of the miner, forcing it on to the central conveyor, whence it is carried back for discharge on to the main conveyors. The discharge conveyor can be swung 40 deg. from centre in either direction, and elevated up to 3 ft. from a minimum discharge height of 3 ft. above the floor.

To complete the periphery of the cutting pattern, there is a cutting chain, also carrying picks, which forms a kerf joining the concentric kerfs cut by the rotor. Cut-out sprockets on the corners of the chain provide a profile which is straight and wide across both top and bottom, making it easier both to manoeuvre the miner and to set roof supports in its track.

Finally, wedge-shaped cutter bars at the top and bottom of the chain break off that section of the face which is not reached either by the rotating arms or the cutting chain. As a result of this method of cutting, the machine produces a good proportion of lump coal, comparing favourably with lump coal obtained by conventional methods.

The complete cutting assembly and the 150 h.p. driving motor are supported on four hydraulic jacks which can be adjusted to enable the machine to follow irregularities in the seam. Two of these jacks permit a lateral movement of the head of 5 deg. on either side, while the other two make it possible to tilt the cutting assembly up to 4 deg. forwards or backwards from the vertical.



The Goodman continuous miner at a scale of $\frac{1}{4}$ in. to 1 ft. A profile of cutting arms and trim chain with special corner sprockets

Each of the caterpillar tracks can be reversed or driven forward independently of the other, and the machine can be turned within a radius of 15 to 20 ft. on the inside of the turn, without backing up. For tramping, it is possible to retract the top and bottom cutting chain sprockets and cutter bars, and to fold the long-hinged arms of the rotors inwards. In this way, the overall width of the machine, including the rotors, is reduced from 13 ft. 6 in. to 10 ft. 2 in., and the overall height from 7 ft. 6 in. to 6 ft. 1 in.

Electrical equipment consists of a 150 h.p. A.C. motor for driving the cutting assembly and a 37.5 h.p. A.C. motor for the hydraulic system, together with the necessary controls. All motors and control equipment were manufactured by Laurence Scott and Electromotors and installed by Distinguon.

The 37.5 h.p. motor drives three hydraulic pumps—one actuating hydraulic traction motors for the tractor drives, one supplying power for the conveyor drive and the third supplying power for 15 hydraulic cylinders. Eight of these cylinders operate the retraction mechanism, the remainder operating the head tilting and elevation, and discharge conveyor swing and elevation. For high-speed tramping, the hydraulic pump serving the conveyor drive can be used to supplement the output of the pump supplying the tractor drives.

This Goodman miner is, of course, a coal heading machine but there is still a need for a machine to drive roadways in the harder rock associated with coal seams. Experiments with a prototype machine of this type are currently under way at the N.C.B.'s Central Engineering Establishment. This machine is being designed to drive 18 ft. dia. tunnels in coal measure strata.

Expanding Outlets for Aluminium

IN the words of Mr. Nathaniel V. Davis, president of Aluminium Ltd., "aluminium with all its excellent properties still has to win a wider acceptance in competition with other materials". From recent reports, however, it is apparent that substantial progress is being made in the development or expansion of applications which hold out considerable promise for producers.

Aluminium in the Oil Industry

Not many years ago the oil industry had little interest in aluminium. Today, the light metal is being used increasingly for storage tanks, pipelines, structures such as drilling rigs, and containers.

The property most relevant to oil industry needs is high corrosion resistance, which results in a great economy in maintenance costs. Aluminium alloys resist the corrosive action of sulphides—e.g., in sour crudes—provided these are free from acid. They also offer good resistance to corrosive atmospheres and to the action of sea water. In consequence they were used (for the first time) to protect the submerged parts of four drilling platforms erected in Lake Maracaibo, Venezuela, where undersea pipelines of aluminium have been used for the same reason. The new-style platforms—believed to be the largest all-welded aluminium structures ever built—are estimated to cost \$170,000-\$200,000—about \$15,000-\$25,000 more than all-steel platforms—but the extra cost is more than offset by long-term freedom from corrosion and by shorter erection time.

Corrosion resistance is also the reason why the oil industry is using aluminium drums for the transport of detergents and aluminium coils for heating crude oil in tankers.

The lightness characteristic of aluminium alloys also offers plenty of opportunities in the oil industry for saving time and money. Aluminium pipes can be man-handled much more easily than steel pipes; the small seismic drilling outfits and the portable well-servicing and drilling rigs now used in the U.S. are more easily erected and moved; aluminium road tankers save fuel and increase payload.

Perhaps the biggest single potential use for light alloys in the petroleum industry is for tankage, especially for sour crudes, which play havoc with the roofs and upper shell courses of steel tanks. This application, which is by no means novel, is becoming important in the U.S. oil industry.

Aluminium cans are coming into use for motor oil in the U.S., Esso Standard having placed a contract for 35,000,000-60,000,000 quart cans. However, they are an economical substitute for tinplate cans only if retained by the garage man and returned as scrap to the manufacturer.

Cheaper Aluminium Cans

The first aluminium cans to be produced in the U.S. at prices lower than steel containers began coming off the production line in April this year, when the U.S. Can Corporation—a newly-organized subsidiary of Victor Metal Products Corporation—officially opened its \$2,000,000 plant at Newport, Arkansas. On display was the first product, a one-piece, seamless 6-oz. rigid can of aluminium. Initial runs are scheduled to meet firm orders from several large soap, toiletry and food companies. An associated company supplies the basic material, aluminium slabs.

The firm was reported to be quoting \$45 per 1,000 on the 6-oz. aerosol cans for quantities of 2,000,000 or more and \$50 per 1,000 for lesser quantities.

By the end of 1958, U.S. Can Corporation expects to be producing at an annual rate of 50,000,000 cans, with each of two producing lines turning out 100,000 units daily. Three more producing lines will be added in the near future, bringing annual capacity to 125,000,000 cans.

The president of the company predicts a huge market for these competitively priced aluminium containers. He expects that by 1968 aluminium will probably have captured a 10 per cent share of the estimated 55,000,000,000 units per year U.S. market (current annual can output is about 45,000,000,000).

Other Recent Developments

The announcement by General Motors of three aluminium V-8 engines has been described as the most significant development for aluminium in the automotive industry to date. These engines have already undergone successful laboratory and road tests. When aluminium engines are adopted by the U.S. car industry, it could mean that this single application would amount to more than 500,000 s.tons of aluminium per year, states Mr. David P. Reynolds, executive vice-president for sales of the Reynolds Metal Co. There are still problems to be solved in the mass production of aluminium motor car engines, but General Motors are optimistic.

Ten-in. seamless aluminium irrigation pipe—claimed to be the first ever commercially produced—is being marketed in the U.S. by Reynolds Metal. It is being extruded to meet the demand for longer high-pressure irrigation lines. The pipe has a 0.094 in. wall and weighs about 3½ lb.

The U.S. Steel Corporation has reported that it will begin marketing aluminium-coated sheet steel late next year for the automotive, aircraft, farm and home appliance industries. The new product, it is stated, will combine the strength of carbon steel with the corrosion and heat resistance of aluminium.

Copper Alloy Bearings

The American Brake Shoe Co. has announced the development of a new copper-alloy bearing for railway freight wagons, which is expected to benefit both railways and the copper industry. It is claimed that this new bearing needs minimum maintenance and should last for 25 years, compared with an average of 3½ years for conventional bearings.

The new device is a "cartridge type" that encircles the freight car axle, instead of providing the conventional 120 deg. bearing surface to the axle. This encirclement prevents displacement between the bearing and the axle when cars are being hauled, and keeps lubricating wastes from entering the bearing.

The bearing uses 65-75 lb. of bronze containing 67-78 per cent copper plus smaller amounts of lead, tin and zinc. About 200 sets have been tested for two years. The cost is about \$535 a car set. Negotiations with railway officials are reported to indicate a substantial new market for copper.

MINING MISCELLANY

A contract valued at \$1,200,000 for the supply of beryllium metal has been signed by the Centre d'Etude de l'Energie Nucleaire, Belgium, with the Brush Beryllium Co. of Cleveland, United States. The metal is for the material and engineering test reactor being constructed at Mol in conjunction with the Nuclear Development Corporation of America.

Three leading Japanese steel manufacturers are to send a survey team to Alaska in August to explore the possibility of the development of coal deposits south of Anchorage. The Jewell Ridge Co., United States, has approached the Japanese with a proposal for joint development of the deposits, estimated at 900,000,000 tons, for export to Japan. A sample survey showed that the deposits contained good coking coal, suitable for steel production. One of the three Japanese concerns is the Fuji Iron and Steel Co. Several Japanese coal mining companies are expected to join in the project.

High-grade uranium ore has been found by a prospector near Olary, in South Australia. The ore samples have given geiger counter readings of twelve hundred counts a second.

Peking geologists, exploring the coastal province of Chekiang, have reported the discovery of what they claim to be one of the world's biggest copper ore deposits.

A new quicksilver deposit has been found near Tabarka in Tunisia. Production is expected to begin fairly soon but the probable output of the mine is not certain.

The annual report of Continental Mining Exploration Ltd. refers to the acquisition of properties of interesting location in the Mattagami and Kipawa areas, Quebec. The Mattagami area was the

scene of the discovery of a large base metals deposit, while the Kipawa area discovery was in gold and uranium. Properties were acquired by Continental in these areas to explore for possible repetitions of the finds made by the original discovery companies.

A team of Japanese coal specialists from the Coal Mining Composite Research Institute of Tokyo has been carrying out a survey of coal resources in Burma. At the beginning of April the team was examining the Arakan area after concluding a survey of the Tenasserim area. Before returning to Japan in July, it proposed to make a visual survey of the Shan States area.

Khan Saleh Mohammed, Deputy Minister for Industries and Mines, Pakistan, has stated that the newly-formed Mineral Development Corporation will start functioning within the next three months. The corporation, besides undertaking development of mines on its own, will aid commercial mining enterprises. The Government of West Pakistan has decided to grant licences and leases on a larger scale for exploration and the operation of mines.

Orders from countries outside the Coal, Iron and Steel Pool received in June by the Pool iron and steel mills, reached a new record of 1,429,000 tons against 585,000 tons in May and 418,000 in June last year. The increase for June is attributed to substantial increases in orders from Argentina, Venezuela, Iran, China and Russia. It is pointed out that Russia generally buys on the Pool market when steel prices have touched their lowest.

The Consolidated Mining and Smelting Co. of Canada has announced an agreement with Conwest Exploration Co. by which Cominco will explore Conwest's K'kana group of claims near Yellowknife, North-West Territories.

Southern Rhodesia has been conducting a detailed investigation into the possibility of establishing an oil-from-coal industry in the Colony, the Southern Rhodesia Ministry of the Treasury and Mines, Mr. Cyril Hatty, has stated in Parliament. An exclusive prospecting reservation in favour of Lubimbi Coal Areas Ltd. has been extended for five years.

Deposits of mica and gold are said to have been discovered in the Maharanjganj district of India, bordering Nepal.

A French group is negotiating a \$42,000,000 contract with the Argentine Government for a development project of the Rio Turbio Collieries. Sofremines will act as consulting engineers for the group, which is headed by the French company Comptoir Industriel et Agricole de Ventes a l'Etranger. The project provides for the stepping up of coal output from the present 200,000 tonnes to 2,000,000 tonnes a year and also for the supply of a coal carrier fleet. Five-year credits would be supplied by French banks.

PERSONAL

Mr. W. J. Gaffney has been appointed chief engineer for all the production plants in Great Britain of The Good-year Tyre and Rubber Co. (Great Britain) Ltd. Mr. R. E. Ward replaces Mr. Gaffney as manager of engineering and maintenance at the company's Wolverhampton plant.

CONTRACTS AND TENDERS

India

Survey instruments, various. Bids to Director, Central Stores Purchasing Department, Government of Andhra Pradesh, Hyderabad. Closing date, August 5, 1958. Ref. ESB/17973/58. Telephone enquiries to Chancery 4411, extension 738 or 771.

Bolivia

Tractors, air compressors, motor graders and other earthmoving equipment. Various numbers and requirements. Bids to Servicio Co-operativo Boliviano-Americano de Caminos, Ave 20 de Octubre, No. 311, La Paz. Closing date, July 31, 1958. Ref. ESB/17881/58. Telephone enquiries to Chancery 4411, extension 354.

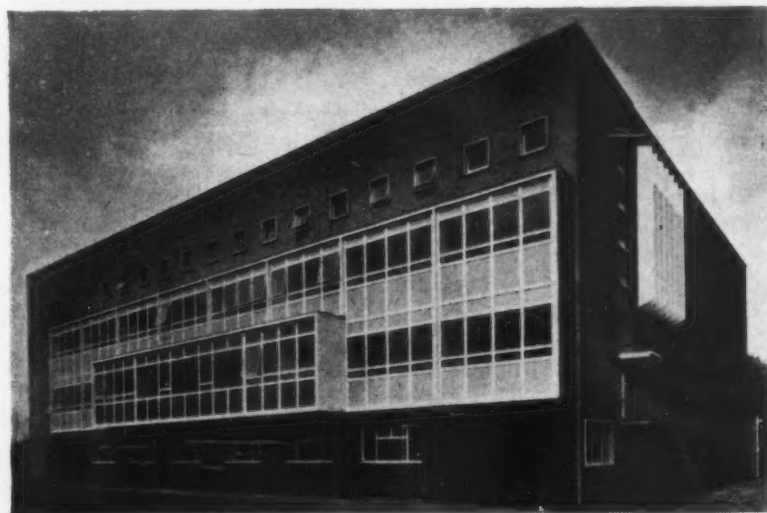
India

Mining and well-boring machinery, including bevel wall diamond core bits, reaming shells, casing shoes and core barrels. Bids to Director General of Supplies and Disposals, Shahjahan Road, New Delhi. Closing date, July 30, 1958. Ref. ESB/17385/58. Telephone enquiries to Chancery 4411, extension 738 or 771.

South Africa

Tractor and bulldozer equipment. Bids to the Chairman, Union Tender and Supplies Board, Assize Buildings, 291 Bosman Street, Pretoria. Closing date, August 7, 1958. Ref. ESB/17805/58. Telephone enquiries to Chancery 4411, extension 738 or 771.

The new high voltage laboratory of Enfield Cables Ltd., viewed from the south-east. The laboratory was opened by Sir Henry Self on July 10, 1958



Machinery and Equipment

Thinking by Dredger

It has been reported that Demag, Duisburg, claims to be the first German company to build dredgers with torque converters.

A new model produced recently and nicknamed "the thinking dredger" automatically adapts its operations to the material on which it is working. Whenever hard ground calls for special pulling power, the torque converter puts that power at the dredger's disposal. In soft ground, however, the power is converted into higher operational speed.

Demag also claims that the converter protects engine and gears from shocks normal in dredging, thus reducing the wear and tear of the equipment.

Comparisons with conventional dredgers of equal size are said to have shown that the torque converter increased the pulling capacity by up to 50 per cent and the operational speed by up to 15 per cent.

EQUIPMENT FOR EXPLORATION

In many instances the exploration geologist must be aided in his investigations by the evidence obtained from drill holes. Also available for use in suitable circumstances are many geophysical techniques which can provide additional information to the geologist or reduce the amount of drilling required.

These techniques, together with the equipment employed in their completion, are discussed in a pamphlet recently released by Site Investigations Co. Ltd., a subsidiary company of Le Grand Sutcliff and Gell Ltd. Initially pointing out that a planned programme should be designed to minimize the costs of exploration, obtain maximum accurate information and reach completion in the minimum of time, the booklet continues to describe various practices used in the search for minerals, oil and water. In the case of the Le Grand group, these practices are employed by the use of equipments manufactured by the company and its associates.

These tools are described in an accompanying enclosure from the parent company. The L3-10-PRB 30 and L3-16-PRB 30 pumping units are specially designed for water-well pumping, air lift pumping plants being full described. The submersible electric pumps series C (C7-C8) Sumo pumps, have a minimum borehole diameter of 6 in. and a maximum water quantity of 8,000 g.p.h. Diaphragm pumps comprise the Dando range.

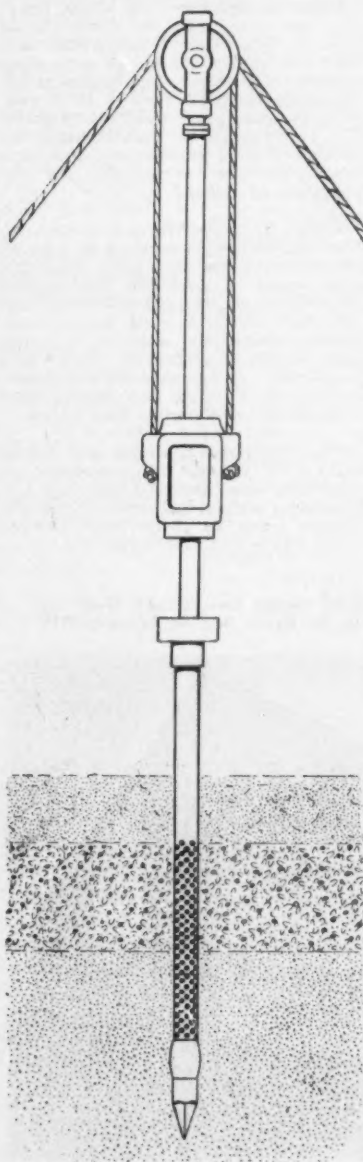
Drilling equipment includes hardened neoprene thread protectors, casing spiders, tubular derricks and sundry tools. The Burns magnetic fishing tool achieves magnetic pull whilst encased in a 4140 steel housing instead of stainless steel.

As a means of quickly obtaining a plentiful supply of water at a minimum cost, the driven tube well is presented as being unsurpassed for shallow operation. In the use of this machine, a perforated and pointed tube is driven into the ground by a monkey until water is reached. The

water rises up the tube and is thus available for use simply by coupling it to a suitable pump, the tube itself acting as the suction pipe. Any number of these tube wells can be coupled together into a common suction pipe and thus draw water from a considerable area of ground.

Drilling rigs produced by the manufacturers include the 18/2 drilling rig, the

The Le Grand driven tube well equipment



The Mining Journal—July 25, 1958

Dando 800 cable percussion drilling rig, and the Isler 10 light unit.

The two pamphlets are of marked interest, and are particularly revealing when studied in conjunction.

THE JOY MICRODYNE IN MINING

The Joy Microdyne is a high efficiency wet impingement dust collector of unusually small size. The impingement section consists of a folded 14 mesh stainless steel wire screen which is wetted by an upstream spray. The dust-laden water leaving the wire screen is removed from the air stream by centrifugal force induced by a set of turning vanes located immediately behind the impingement screen. The turning energy induced in the air is later removed at the exit end of the dust collector with a set of straightening vanes. The development of this dust collector followed examination of a unique impingement dust collector developed by the Anaconda Copper Co.

After this Warren collector was brought to the Joy Research Laboratories for evaluation, research began on possible approaches which would improve performance and reduce size. The first effort was made in the impingement section. Aero-dynamic principles were utilized and a large number of impingement arrangements were designed and tested which could provide for the impingement of dry dust on wetted surfaces. Continual improvement in performance was attained with a number of elements but finally it was established that the best impingement device consisted of a single wire screen folded in continuous V's.

The short radius turn made necessary by the configuration of the wires in the screen provides powerful inertial forces which lead to impingement on the wetted wires at the screen.

Some particular applications of this collector would appear to be worthy of discussion. At a large iron ore mine in northern Michigan a Joy Microdyne is installed at the main crushing plant underground. Previous to the installation of a collector, dust was controlled by hooding and a fan. The dust count in the area varied from 40,000,000 to 130,000,000 particles per cu. ft. After the installation of the Joy Microdyne the particle count on the working platform on the crusher varied from 4,840,000 to 5,520,000 particles per cu. ft. Below the crusher, the dustiest point of the area, the particle count was 7,700,000 particles per cu. ft. The discharge from the collector was 5,380,000 particles per cu. ft. At this operation the acceptable limit is 10,000,000 particles of iron ore dust per cu. ft.

Another interesting application has been in connection with the continuous miner in coal. In this case a 12,000 cu. ft. Joy Microdyne was placed downstream in the airway from a room neck. A 24 in. flexible tube was run from the dust collector to the rear of the continuous miner on the opposite side from the operator. With a volume of 12,000 cu. ft. adequate velocity was established across the face and conveyors of the continuous miner to provide an essentially dust-free condition at the operator's station.

At the present time there is being installed underground at a large mining operation in Colorado a 60,000 cu. ft. dust collector utilizing this principle. It is believed that where air temperature and explosive or noxious gas is not a factor that mine ventilation requirements may be re-

duced as much as 50 per cent by utilizing this principle.

It should be pointed out that there are limitations to the application of a collector of this type, as is the case with any other collector. It is not suitable for the collection of fibrous material since the fibrous material collects in the impingement screen.

It cannot reach the ultimate performance of a bag house or an electrostatic collector when they are installed for maximum performance. It does, however, very closely approximate the performance of these systems and frequently exceeds the performance of the electrostatic collector as usually applied.

Specific advantages of this type of collector are its small size, ranging from 1/10 to 1/20 of other collection devices by volume occupied, its low weight, and the small amount of water normally required, ranging from .5 to 1 gal. of water per 1,000 cu. ft. of air per min. (This figure can be reduced by 90 per cent or more by installation of a small settling tank and recirculation of the water). Its low installed cost is a result of installation ease.

RHODESIAN COPPER PROJECT

The N'Changa copper mining venture has brought a big gearing order for David Brown Precision Equipment (Pty.) Ltd., of Benoni, Transvaal. Twenty-eight David Brown spiral-bevel helical units were ordered and are at the present time being installed to drive conveyors moving 2,800 tons of overburden an hour. All the units, of three sizes, run at 960/75 r.p.m., transmitting 210, 175 and 130 h.p. respectively.

Designed at the Benoni works, the units were built by David Brown Precision Equipment (Pty.) Ltd. almost wholly from components manufactured on the spot. In each case the drive from the motor is through a fluid coupling, and a David Brown "Cone-Ring" coupling caters for any shaft deflection. Each unit has its own forced lubrication system, effected by a David Brown Roloid pump which is mounted internally and chain-driven.

The units used on the main conveyors have a roller hold-back device fitted on the intermediate shaft, while certain others have a brake fitted on the cone-ring coupling. Completely weatherproof guards are fitted on these latter units, which will operate outdoors in a climate alternating between hot, dry and dusty conditions for the greatest part of the time, and occasional torrential downpours. For this reason double oil seals are fitted, together with a special breather.

As the smaller units, which are complete with bedplates and accessories, have to be moved from time to time, the baseplates have three-point supports mounted on taper wedges to allow for adjustment.

ACCURATE HOLE SURVEYING

An innovation in hole surveying employed at the Calloway mine of Tennessee Copper Co. at Copperhill, Tennessee, held survey error to 1 ft. per 354.5 ft. of hole drilled. The new method was a product of a need for shaft extension at the mine. Mining requirements in this case made it practical to drill the pilot hole in two parts.



Assembled spiral bevel/helical units ready for despatch from David Brown's Benoni plant

The pilot hole and raising method was chosen for the operation. Although this system had been used previously on the property, no satisfactory hole surveying method had been employed. In that instance, when the hole was located, it was found to be approximately 8 ft. from its calculated position.

A hole surveying method was needed that would show hole deflection from the vertical down to 1 deg. or less. In the past, the Maas compass method had been used for exploratory EX and AX holes, but for the new hole envisaged the previous practice would not register the small changes in deflection that—before the fact was realized—could take the hole outside the shaft diameter. In addition, of course, the changes in bearing accompanying the dip changes would be of less than desired accuracy.

The hole was drilled with a 3½ in. bit. It was decided that with the hole fixed at this size, and the glass tube used for surveying enlarged from 1 in. dia. to approximately 3 in. dia., change in hole dip could be registered to nearly 0.5 deg.

It was considered that the bearing measurement would present more of a problem. The Maas compass was too small for so large a tube, and to obtain a larger needle more suited to the size of the tube, a 2½ in. needle and pivot from the Brunton compass were employed.

Two survey tubes at each survey point were used. The individual tubes were placed each in a watertight brass tube and spaced 10 ft. apart. A wooden splint alongside the glass tube kept it erect within the brass container. Care was exercised when placing and subsequently lowering these equipments.

A further necessary device was the goniometer for reading measurements. Because the dip angle so nearly approached the vertical, the dip ellipsoid etched on the glass tube was nearly a circle, and the long axis of the ellipse harder to ascertain. The block or tube holder with parallel lines across the trough, aided in reading the high and low points on the etched ellipse as it was rotated in the trough. With proper orientation established, the dip and bearing of the hole are read.

It is known that drill rotation in vertical holes, even in homogeneous rocks,

tends to produce a clockwise spiral in the drill hole. Vibration caused by undersize rods is a factor that can be controlled by the operator, some of the remedies being: ferrules and guide rods or drill collars above the core barrel; core barrels with welded metal ribs; drill rods of maximum size for the hole being drilled; couplings built up to the maximum diameter by ribs, inserts, or hard surfacing methods; and sharp bits.

Only 10 ft. of 3¼ in. guide rod and 100 ft. of N-size rods were at first available in this operation. Later 30 more 19 ft. lengths of N-size rods were used. Victorite, a hard metal was used as rubbing to build up the outside diameter from 3½ in. to 3¾ in. A similar coupling with Victorite ribs was made to fit the top of the core barrel.

All these measures, together with frequent bit changes and light drilling pressures, were successful in reducing vibration and rapid hole deflection.

In conclusion, the use of the Brunton needle and pivot precludes its application to holes where maximum deflection may be greater than 10 deg. to 12 deg. This apparatus can be utilized only where controlled vertical drilling is required. Since pilot hole drilling in shaft extensions falls in this category, the obvious merits of this surveying mechanism are its relative simplicity, low cost, and apparently reasonable accuracy.

The treatment for keeping hole deflection at a minimum was nearly exhaustive, although even more frequent bit changes might have increased the total depth of usable hole somewhat. By using deflecting wedges it would probably have been possible to drill the 470-ft. lift successfully, or even the entire 670-ft. length. Deflection from the upper hole's near vertical position at 150 ft. downward averaged 1 deg. 10 min. per 50 ft. drilled. With a maximum possible correction of 1 deg. 30 min. for each wedge used, about seven wedges would have been necessary to reach the 10 level and remain within the shaft perimeter.

Had it not been necessary to connect the two shafts on the 6 level much of the development work could have been eliminated and a one-hole installation on surface would have gone through to the 10 level.

Metals and Minerals

Alcan Reduces Output

The trend towards production cutbacks by North American aluminium producers is underlined by this week's news that the Aluminum Co. of Canada will reduce its annual rate of production by a further 60,000 tons from next month. When the new cuts come into force Alcan's installed smelter capacity of 770,000 tons per annum will be running at about 72 per cent utilization, as against 80 per cent at present. It will be recalled that these cuts are in addition to the decisions taken last year to defer the completion of a further 240,000 tons of primary capacity scheduled for Quebec and British Columbia.

Production cuts by various U.S. producers have already been reported in recent weeks while at the mining end of the industry the Kaiser Bauxite Co. have announced the prospective dismissal of 280 employees as a result of production cutbacks.

None of this comes as any surprise in the face of the fierce price cutting in European markets reported here a fortnight ago. All these short-term readjustments do not, however, detract in any way from the long-term outlook for the metal. New uses for aluminium, more especially in the large tonnage markets, are coming into sight all the time, a fact which is well illustrated by this week's article on page 102.

PRODUCERS CUT PLATINUM PRICES AGAIN

The factors depressing the platinum market remain little, if any, changed from the position as described in this column in our issue of May 16 although their continued pressure has now resulted in a further price cut by producers this week in response to the declining open market quotation. In New York the \$67-\$70 range has been cut by \$5 to \$62-\$65 while on the London market both Baker Platinum and Johnson Matthey are quoting £23½ per oz. against £25 previously. Similarly, both firms are quoting £6 for palladium against £6½ previously. Rustenburg Platinum Mines states that platinum sales during the financial year ending August 31 next are likely to be about half the total sold in the previous twelve months. This would suggest that sales are currently even below this level as demand did not really begin to slacken until a year ago.

THE MAJOR PRODUCER GETS NO HELP!

International Nickel has reduced its American price for 75 per cent nickel oxide by ¼ c. per lb. of contained metal. Moreover, the lower price in-

cludes packaging where previously the quotation was unpacked f.o.b. Copper Cliff. It is, therefore, not clear what precisely the actual price cut amounts to. This price adjustment has apparently been made in response to requests from the American steel industry that the Inco quotation should be brought on to an equivalent basis to that of the Cuban nickel oxide produced and sold by the U.S. Government.

In contrast to the production cutbacks and price adjustments which have characterized Inco's operations this year, the Falconbridge operations in Norway continue to expand. Nickel production is now stated to be running at an annual rate of about 24,000 tons compared with the 1957 rate of 21,000 tons. These are small quantities in themselves but they do serve to emphasize the difficulties of the major producer in his efforts to stabilize prices except in the rare case where he has a near world monopoly. There is no doubt a lesson in all this for those preparing to attend the study conference on international control of copper, lead and zinc next September.

ASBESTOS IN AUSTRALIA

A slowly growing branch of the Australian mining industry is the production of asbestos, writes our correspondent. Attempts to produce chrysotile have been short-lived. The most important asbestos mining undertaking has been that by the Colonial Sugar Refining Co. in the Hamersley Ranges of Western Australia, where that company's subsidiary, Australian Blue Asbestos, has built up an important industry. The asbestos seams occur in horizontal beds, exposed in the sides of deep gorges cut into the range, and are consequently mined by tunnels and coal-mining methods. The area containing these occurrences is very extensive. The fibre is largely exported and production approximates 13,000 tons per year. Australian Blue Asbestos is opening a new treatment plant costing £A350,000 which will raise output to 25,000 tons of fibre per year. There seems to have been prejudice among Australian users against local fibre, but this seems to be decreasing, while export is rising substantially.

Chrysotile appears to be relatively unimportant in the north-west of Western Australia, but the mining of this type of asbestos could be of some importance in the north-east of New South Wales, where one company has been working for some years and is now erecting a new treatment plant.

U.S. QUICKSILVER STATISTICS

Reports on quicksilver in 1957 and also in the first quarter of 1958 have been released by the Bureau of Mines, U.S. Department of the Interior. Despite an increase in receipts of quicksilver from Spain, United States general imports in 1957 declined 13 per cent from 1956 to 45,500 flasks, less metal being received from the other principal sources—Italy, Mexico, and Yugoslavia. Im-

LONDON METAL AND ORE PRICES, JULY 24, 1958

METAL PRICES

Aluminium, 99.5%, £180 per ton	Iridium, £22 oz. nom.
Antimony—	Lanthanum (98/99%) 15s. per gram.
English (99%) delivered, 10 cwt. and over £190 per ton	Manganese Metal (96% - 98%) £290
Crude (70%) £190 per ton	Magnesium, 2s. 5½d. lb.
Ore (60%) bases 19s. 6d./20s. 6d. nom. per unit, c.i.f.	Nickel, 99.5% (home trade) £600 per ton
	Osmium, £16 oz. nom.
Arsenic, £400 per ton	Osmiridium, nom.
Bismuth (min. 1 ton lots) 16s. lb. nom.	Palladium, £6 5s.
Cadmium 10s. 0d. lb.	Platinum U.K. and Empire Refined £23 5s. oz.
Cerium (99% net), £16 0s. lb. delivered U.K.	Imported £20 0s./£21 0s.
Chromium, Cr. 99% 6s. 11d. lb.	Quicksilver, £79 0s. ex-warehouse
Cobalt, 16s. lb.	Rhodium, £40/£42 oz.
Germanium, 99.99%, Ge. kilo lots 2s. 8d. per gram, c.i.f.	Ruthenium, £14/£16 oz. nom.
	Selenium, 50s. 0d. per lb.
	Silver, 75d. f. oz. spot and 74½d. f'd.
	Tellurium, 14s./15s. lb.

ORES AND OXIDES

Bismuth	30% 5s. 0d. lb. c.i.f.
Chrome Ore—(Fe ratio 3:1)	20% 3s. 3d. lb. c.i.f.
Rhodesian Metallurgical (semifriable) 48%	£16 5s. 0d. per ton c.i.f.
" Hard Lumpy 45%	£16 0s. 0d. per ton c.i.f.
" Refractory 40%	£11 10s. 0d. per ton c.i.f.
" Smalls 44%	£14 10s. 0d. per ton c.i.f.
Baluchistan 48%	£11 15s. 0d. per ton f.o.b. nom.
Columbite, 65% combined oxides, high grade	
Fluorspar—	
Acid Grade, Flotated Material	£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF ₂)	156s. 0d. ex works
Lithium Ore—	
Petalite min. 34% Li ₂ O	47s. 6d./52s. 6d. per unit f.o.b. Beira
Lepidolite min. 33% Li ₂ O	47s. 6d./52s. 6d. per unit f.o.b. Beira
Amblygonite basis 7% Li ₂ O	£26 5s. per ton f.o.b. Beira
Magnetite, ground calcined	£28 0s./£30 0s. d/d
Magnetite Raw (ground)	£21 0s./£22 0s. d/d
Manganese Ore Indian—	
Europe (46% - 48%) basis 67s. 6d. freight	nom.
Manganese Ore (43% - 45%)	nom.
Manganese Ore (38% - 40%)	nom.
Molybdenite (85% basis)	8s. 5d. per lb. (f.o.b.)
Titanium Ore—	
Rutile 95/97% TiO ₂ (prompt delivery)	£35/£36 per ton c.i.f. Aust'n.
Ilmenite 52/54% TiO ₂	£11 10s. per ton c.i.f. Malavan
Wolfram and Scheelite (65%)	62s. 0d./66s. 0d. per unit c.i.f.
Vanadium—	
Fused oxide 90 - 95% V ₂ O ₅	£10 per unit c.i.f.
Zircon Sand (Australian) (65 - 66% ZrO ₂)	£14 5s. per ton c.i.f.

ports for consumption totalled 42,000 flasks.

Expansions at chlorine and caustic soda plants using mercury cells, coupled with a 20 per cent increase in the quantity of quicksilver required for replacement at similar installations, helped to keep consumption high at 53,000 flasks—only 2 per cent less than in the preceding year. In the other major uses, consumption continued unchanged for industrial and control instruments, but fell 6 per cent for electrical apparatus and 36 per cent for agricultural purposes.

World production of quicksilver continued upward and reached an estimated 235,000 flasks in 1957 (215,000), this being the highest annual rate since 1942. The largest producers were Italy (63,237 flasks), Spain (50,000), the United States (33,380), Mexico (21,089), and Yugoslavia (12,328).

Although United States domestic production of 8,100 flasks in the first quarter of the current year was 14 per cent less than in the preceding quarter, it exceeded the corresponding period of 1957 by 22 per cent. United States general imports, based on the first two months of 1958, were at an annual rate of 31,700 flasks compared with the 45,500 flasks

imported in 1957. Of the 5,300 flasks received during January and February, 1,850 flasks were Mexican metal purchased by G.S.A.

United States quicksilver consumption in the first quarter of 1958 rose 19 per cent over the last quarter of 1957 to 11,200 flasks. The increase was due chiefly to large quantities used for agricultural purposes, in electrical apparatus, and for replacement purposes at chlorine and caustic-soda plants.

For physical supplies of quicksilver on the spot, a price of £79 per flask ex warehouse London is now suggested. A fortnight ago the price was £76, at which level it had remained for several weeks.

Available supplies are reported to be not too flush. It is believed that at the lower levels recently reached, Mexico preferred to sell direct to the United States General Services Administration at the guaranteed price of \$205 f.o.b., or about £73½. Moreover, despite recent talk of a possible crack in the Spanish and Italian export price, this has not yet materialized. Both countries are still quoting £80 f.o.b. with Italy reportedly meeting a good demand on the Continent.

COPPER • TIN • LEAD • ZINC

(From Our London Metal Exchange Correspondent)

The markets in metals have been singularly unaffected by the political developments during the last week. In fact, although the slightly lessening tension has resulted in a weaker undertone for tin, lead and zinc, the copper market has shown signs of increasing strength. There has been absolutely no sign of consumer re-stocking or of speculative purchases on the one hand, nor of any selling in anticipation of a quick solution to the problems in the Near East.

COPPER NEWS MAINLY CHEERFUL

The copper market, which started the period under review with the publication of the lower June production figures in the U.S., has been further assisted by the U.S. Copper Association's figures for the June consumption. These show that domestic shipments of fabricated products by brass and wire mills and foundries increased sharply from 88,447 s.tons in May to 108,510 s.tons. New business and unfulfilled orders were both better, and fabricators' stocks were down from 441,001 to 433,526 tons. Also at the end of last week, Kennecott came into line with the two other major producers and raised its selling price to 26½ c. per lb. and this was followed by the customs smelter price being raised to the same level. Thus for the first time for many months there is a uniform quotation in the States.

The Belgian smelter also raised its price to remain in line with the higher prices ruling in London. It is reported that business has fallen off in America at the uniform price level, but this can be explained to some extent by the seasonal shutdown of a number of plants.

In Europe the demand remains good and the scarcity of wire bars is still giving rise to substantial premiums which in some cases exceed the £12 per ton mentioned last week. Stocks in official ware-

houses showed another fall of over 500 tons during the week and the contango continues to remain small.

Apart from the facts recorded above, sentiment has been helped by talk of a lessening in the restriction of trade with Russia and China and the rumour that copper will be included in the list. Also in the States the Bill including authority to stockpile 150,000 tons of metal is having an easier passage through the House of Representatives Committee and the possibility of its becoming law before Congress recesses is now rated fairly high.

I.T.C. IN SESSION AGAIN

Taking into account all the above factors, and the general trend of opinion in the States as registered by the behaviour of Wall Street, it is perhaps not over-optimistic to expect the present prices to be approximately the lower level of the price bracket which will develop during the autumn. Apart from one violent increase in the price of tin in Singapore, which only lasted for one day, the market has been featureless at a level slightly above the £730 per ton mark for cash.

At the time of writing, all sections of the trade are marking time pending the communiqué to be issued at the end of the present Tin Council Meeting in London. On Thursday morning the Eastern price was equivalent to £758½ per ton c.i.f. Europe.

PRICE SUPPORT PROSPECTS DEPRESS

In spite of the progress of the Price Support Policy Bill in the United States referred to above, general sentiment in the lead and zinc markets has become more depressed, as the belief is that the intro-

duction of the measure will tend to cause increases in U.S. domestic production and will make the maintenance of the present price basis more difficult. Of the two metals the future of lead is still the most cloudy, as in zinc there have been cut-backs in production and in Europe at least the higher grade metal is well sold for the next months.

The U.S. Bureau of Mines reports that the consumption of zinc in the States during April remained at approximately the same daily rate of use as in March at 1,918 s.tons. Stocks of slab zinc at smelters increased by nearly 18,000 tons to the very high figure of 221,200, and against this there was only a small drop in consumer stocks of about 4,300 tons.

Closing prices are as follows:

	July 17		July 24	
	Buyers	Sellers	Buyers	Sellers
COPPER				
Cash	£204½	£205	£203½	£204
Three months ..	£205½	£205½	£204½	£204½
Settlement ..		£205		£204
Week's turnover	7,900 tons		8,625 tons	
LEAD				
Current ½ month	£73	£73½	£71½	£71½
Three months ..	£74½	£74½	£72½	£73
Week's turnover	5,900 tons		4,175 tons	
TIN				
Cash	£735	£735½	£732	£732½
Three months ..	£738	£738½	£735	£735½
Settlement ..		£735½		£732½
Week's turnover	740 tons		630 tons	
ZINC				
Current ½ month	£65½	£65½	£63½	£63½
Three months ..	£65½	£66	£64½	£64½
Week's turnover	7,050 tons		4,350 tons	

100 BALL MILLS

Individually motorized with 3 h.p. 400/3/50 Metro-Vick geared Motor, geared down to 34 r.p.m., complete with Starter, Internal drum size 17 in. dia. x 24 in. deep, complete with safety cover and Switch. Equipment has come from Government factory and is little used in good condition. Price £40 each. Interchangeable Stellite Liners for drums available at £60 each. (Weight of Stellite Liners approx. 3 cwt.) Also Tungsten Carbide Pebbles at 4s. per lb. Davidsons Engineers (M/cr) Ltd., Irkdale Street, Smedley Road, Cheetham Hill, Manchester 8. Telephone No. COLlyhurst 1610.

METALLURGIST

An important Commonwealth mining house requires a graduate metallurgist (or chemical engineer) for work both in their London Office and their Laboratory in South Wales. Applicants should have some operating experience in metallurgical processing plants in addition to sound laboratory experience.

Salary would be dependent on qualifications and experience, but starting salary would not be less than £1,300 p.a. There is a contributory pension scheme and certain other benefits are provided. Write, with full details of age, qualifications, experience, and availability, to A.642, c/o Streets, 110 Old Broad Street, E.C.2.



Trade with the East

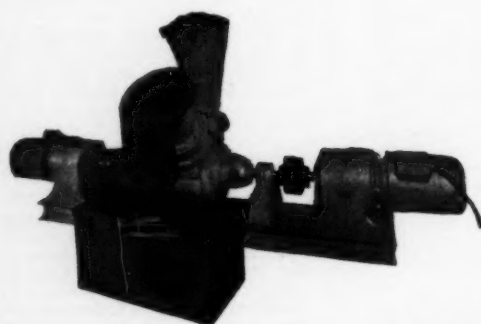
From Cyprus and the Lebanon to Japan,
THE CHARTERED BANK
and its wholly-owned subsidiary, The Eastern Bank Limited, link East and West through a system of one hundred branches extending to most centres of commercial importance in the Middle East, South and South-East Asia and the Far East. Those branches provide complete and up-to-date banking services, sustained by wide knowledge and long experience of Eastern trade, finance and industry. In particular an effective credit information service and skilled assistance and advice are available to merchants and manufacturers seeking new business connections in Asian markets.

THE CHARTERED BANK
(Incorporated by Royal Charter 1853)
HEAD OFFICE: 38 BISHOPSGATE, LONDON, E.C.2
Branches in the United Kingdom at Manchester and Liverpool. Agencies at New York and Hamburg

THE EASTERN BANK LIMITED
Head Office: 2 and 3 Crosby Square, London, E.C.3

COMET

**POWERFUL, POSITIVE-ACTION,
SLOW-REVVING PUMPS**



A 4" heavy duty pump, driven simultaneously at each end by two 3 h.p. synchronised motors used for such applications as pumping liquorice, tar, soap, etc.

**THE COMET PUMP & ENGINEERING
COMPANY, LIMITED**

JOHNSON ROAD, WEST CROYDON

Telegrams: Comet, Croydon. Telephone: Thornton Heath 3816

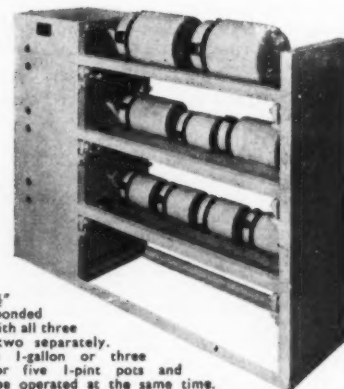
laboratory ball mills

Available in many types for rolling ceramic, metal and rubber pots from 5-gallon to 1-pint nominal capacities.

Mill illustrated is extremely useful unit for carrying out several jobs at the same time on one or more materials of varying quantity or time of processing.

Arranged with three separate motors and with three pairs of 2½" diameter white rubber bonded rolls in three tiers. Usable with all three in operation or one or two separately. Each tier will carry two 1-gallon or three ½-gallon or four 2-pint or five 1-pint pots and combinations of these can be operated at the same time.

Mill shown only one of many types available from miniature 1-pint model for processing small quantities of expensive materials to larger 5-gallon model with tilting cradle in which the pot is securely held, charged, operated and discharged without having to lift this heavy pot from cradle.



Write or telephone
Crawley 25166 for
List B.M. 2907

PASCALL

The Pascall Engineering Co Ltd • Gatwick Road • Crawley • Sussex

Mining Finance

No Big Scheme for Marginal Golds

It looks as though any grandiose scheme for substantially prolonging the profitable lives of what are generally referred to as South Africa's marginal gold mines is now unlikely to be forthcoming. The findings of the special committee which investigated the position of these mines last year and made certain recommendations to the Union Government for assisting them have still to be published, but the Minister of Mines, Dr. Van Rhyn, is now reported to have said that there is not much that can be done to prolong materially the lives of this class of mine. A scheme, however, is being investigated, he went on, which could have the effect of easing the impact of pneumoconiosis levies on companies of this type which, in the eyes of the Department of Mines number 14, although they have not been officially classified as such. They account for about 17 per cent of the industry's total gold output and employ some 23 per cent of the European labour force and 25 per cent of the African force.

The absence of any specific form of artificial assistance for these mines would not mean, of course, that they would all be on the verge of closing down forthwith. It should also be emphasized that

any government steps aimed at keeping them going beyond what may be described as their "normal" economic life would be primarily to ensure that every ounce of gold possible is got out of the ground and also to cushion the effect on the employment situation. The payment of higher dividends to shareholders would not be designedly part of the plan.

OFSITS CAPITAL STRUCTURE

Orange Free State Investment Trust, the Anglo American Corporation group's holding company for O.F.S. gold shares, has, as expected, increased its interim for 1958. The payment of 1s. 6d. per 10s. share compares with 1s. last July which was followed by a final of 2s. in January. What has perhaps not been generally realized is that the present interim is on the capital as increased by the exercising of the various rights attaching to the 5 per cent Notes and the 4½ per cent bonds, rights which expired on June 30.

Holders of practically all the sterling Notes elected to convert into Ofsit shares at 60s. Most of the holders of the Swiss bonds, on the other hand, exercised their

alternative right which was an option to take up shares at 60s. The result of all this on Ofsit's capital is shown in the accompanying table.

	Dec. 31, 1957	June 30, 1958
	£	£
Ordinary capital in		
10s. shares ...	4,545,843	5,159,203
5 p.c. Notes ...	1,762,757	16,378
4½ p.c. Bonds ...	2,040,816	2,023,183

The interim will thus have required a payment of £773,880 against £454,482 absorbed by last year's 1s. interim. The shares subscribed for in Switzerland have brought in new funds of £1,955,259. It is naturally hoped that the growing income which Ofsit is receiving from the new mines of the O.F.S. field will result in an increased final for 1958. The 10s. shares stand at 65s. 9d.

WESTERN SELECTION PROGRESS

The results of Western Selection for the year to September 30 last, the balance sheet position and the chairman's review were fully discussed here on July 4. At the meeting this week a director of the company, Mr. C. J. Burns, brought up-to-date the developments that are taking place on the Canadian properties in which a substantial interest is held—Cordoba Mines and Genrico Nickel Mines. Following a ground magnetometric and electro-magnetic survey by Mr. T. Koulomzine, a first series of 20 exploratory drill holes have been recommended at Cordoba of which the first eight have already been put down, but have apparently revealed no actual economic gold values. Mr. Burns regards the extensive drilling programme as well warranted and considers that it has an "excellent chance" of leading to a successful conclusion.

As regards Genrico Nickel the geological work is almost completed and drilling is expected to start in the next month to six weeks. Western Selection proposes to issue a progress report when a true and proper assessment of the drilling results on these properties can be made. At the same time it hopes to indicate its own preliminary profit figures for the current financial year to September 30 next. In Ghana the mining expert, Mr. G. C. Monture, brought out by the Ghana Government to examine the gold mining industry with a view to proposing subsidy legislation, is now at work on the properties in which the company is substantially interested.

MAWCHI IN TROUBLE AGAIN

The troubles of Mawchi Mines, the Burma tin-wolfram producer, continue. Occupied by the Japanese during the war the property subsequently suffered from the civil war in Burma. It last restarted operations in January, 1956. At the end of last year an agreement was signed with the Burma Government whereby the mine is now worked on a joint basis. At the same time there was trouble in London from some of the company's shareholders and a shareholders' committee was set up with Lt. Cdr. J. L. Huntingford as its chairman.

Now in an interim report, the board (chairman, Mr. Robert Annan of Consolidated Gold Fields) makes the following points: (1) owing to the sharp fall in the price of wolfram, the fact that most of the joint venture company's output to date is still unsold, together with a disappointingly low production, it is not possible to indicate the extent of the loss

LONDON MARKET HIGHLIGHTS

The past week or so has seen an erratic gold share market. There is no doubt that the underlying tendency was a firm one, but whenever share prices seemed set for a fresh rise a new disturbing development or rumour from the Middle East quickly checked the movement.

There was a sharp bout of selling from Johannesburg on last Thursday week which gave the Kaffir market one of its most severe knocks for some time past. London shareholders remained aloof from the selling activity and perhaps taking heart from this attitude the Cape sellers ceased operations on the Friday and a few cautious buyers reappeared. Riebeeck, for instance, rallied well from the setback of the previous day and "Ofsits" began to reflect the very satisfactory interim dividend that had been earlier ignored. The latest quarters helped the better tendency of the market, particularly in the case of Buffels, which quickly moved ahead on the sharp rise in both tonnage and value of their ore reserves. Buyers were also interested in Hartebeest and St. Helena. Among firm spots in the Finance section Johannesburg Consolidated benefited from hopeful dividend anticipations.

Then, just as all seemed well again, the inevitable happened. Vague reports—still unconfirmed at the time of writing—reached London that Kuwait had joined the United Arab Republic. The crop of plus signs that had started to appear that morning on the jobbers' price lists disappeared again, but no real attempt was made to sell, and at the present time

prices are again trying to edge ahead. The immediate outlook is entirely bound up with developments in the Middle East and erratic movements must be expected.

Meanwhile, platinum shares had troubles all of their own. These took the shape of yet another cut in the Baker Platinum price of £1 15s. to £23 5s. per troy oz. The reduction was followed in a matter of hours by a similar marking down of the Johnson Matthey quotation. Share prices followed suit. "Pots" (4s. 3d.), Waterval (6s.), Lydenburg (5s. 9d.) and Unions (5s.) all losing ground.

For most of the period, copper shares fluctuated narrowly and never seemed ready to take any decided trend. This was rather strange in view of the strength of Wall Street and the firmness of the metal price.

Interest in other base-metals also petered out. In lead-zincs, Consolidated Zinc were a firm market for a while and moved up to 2s. 6d. to 50s. Later however, such buying as there was dried up and the shares quietly slipped back to barely 49s.

Tins remained comparatively steady, but business was at a very low ebb indeed. Beralt at one time looked a little firmer on the welcome improvement in the wolfram price. The sad plight of Mawchi (1s. 9d., dealt with elsewhere) had little effect on the shares which, if anything, were inclined to go better. The tendency, however, was largely the result of the heavy bear position that has built up in this stock.

that the joint venture company will incur in its first accounting period (2) an amount of £75,000 has had to be borrowed from the Mineral Resources Development Corporation in Rangoon (3) rebel activities have broken out again and the property damaged so that all prospect of reaching profitable production in the near future has been removed (4) in the circumstances a proposed inspection by John Taylor and Sons has been postponed and the joint venture company has been advised to reduce operations to a minimum until conditions improve.

On top of all this Lt. Cdr. Huntingford has stated that his committee has lost confidence in the board and will be taking separately such steps as it considers necessary. It is somewhat difficult to see exactly what steps to improve the outlook can be taken in present circumstances. Mawchi 4s. shares are an uncertain market at around 1s. 6d.

BREMANG PASSES ITS DIVIDEND

Bremang Gold, the Ghana gold-dredging company in the Finsbury Pavement House group, has not only had to face the difficulties that have beset most gold producers in the last few years, but at the same time has had to undertake a major dredge removal programme that has cost a good deal of money as well as disrupting production from time to time. Three of the four dredges have now been moved. During 1957 the third dredge (No. 4) was out of commission for nearly seven months, but the company was able to maintain its earnings, the net surplus being £70,860 against £74,590 in 1956. As then, £50,000 is written off dredge transfer expenditure, but on this occasion the balance is added to the carry-forward which thus rises from £56,517 to £77,448, the dividend (5 per cent on the 2s. stock units in each of the two previous years) being omitted.

The reason given for this omission is that the Board does not feel justified in making any payment while "arrangements are being made with the Ghana Government for stabilizing the financial position of the company". Such negotiations are presumably designed to find a scheme to replace the 1956 Ghana Government grant to the low-grade concerns which expired at the end of last month. It brought in £9,259 to Bremang last year. The chairman, Major-General W. W. Richards, points out that the company is operating profitably and that dividend payments will be resumed as soon as the cash position permits. For the first five months of 1958 the operating profit has been £87,721 — more than twice the £40,457 for the corresponding period of last year, when earnings for the full period were equal to 29 per cent gross on the £421,685 capital.

In the current year the last of Bremang dredges (No. 3) will exhaust its present reserves and will thus have to be transferred from the Ankobra River to the Offin River early in 1959, an operation that is planned to take six months. Meanwhile, all four dredges are working. The balance sheet shows the strain which the dredge removals are putting on the company's resources. At December 31 last there was a bank overdraft of £70,011 and there is a £200,000 debenture that has to be paid off by the end of 1961. Bremang 2s. stock units stand at 1s. 7½d. They seem to have recovery prospects especially if any financial arrangement with the Ghana Government proves to be a favourable one.

WESTERN SELECTION AND DEVELOPMENT

CANADIAN INTERESTS

The twenty-eighth annual general meeting of Western Selection and Development Co., Ltd., was held on July 23 at the Chartered Insurance Institute, London, E.C.

Mr. C. J. Burns, a Director of the Company, presided and said:—

On May 22 of this year I was in Winnipeg to take the chair at the first Annual General Meetings of Cordoba Mines Limited and Genrico Nickel Mines Limited, our Canadian interests. The reports I made at those Meetings have been printed in full in the Chairman's Circular Review. Since the date of these reports we have received Mr. T. Koulomzine's latest report on the ground magnetometer and electro-magnetic survey carried out by him on the Cordoba Mines property on which the present drilling campaign has been based. This report states that a first series of 20 exploratory drill holes have been recommended as a result of this survey. Eight of these holes have already been drilled. These holes are aimed to test a number of electromagnetically indicated conductors and several crucial points where iron formation bands are either severely folded or faulted and, therefore, present conditions particularly favourable to gold deposition. It should be noted here that all the holes already bored revealed the presence of iron formations which have been silicified and mineralized with pyrite and pyrrhotite.

The task of adequately exploring the Cordoba holdings can now be seen as a major undertaking requiring an extensive programme of diamond drilling. The twenty holes already recommended, of which eight have been bored to date, represent only about half of the widely-scattered exploration holes that will be necessary to test the ore-making possibilities of the central section of the Cordoba property. The exact location of further exploration holes is to be chosen only after the completion of the first series, because the results of the first drilling may influence the choice of the exact drill locations. A programme of some additional 15-20 holes will be required to explore the potentialities of the north and south sections of Cordoba.

The widespread occurrences of gold found in several sections of Cordoba as well as the results of the surveys which point to the presence of a great number of favourable structures and lenses of mineralization induce us to consider that the extensive programme of drilling recommended and already started is well warranted and has an excellent chance of leading to a successful conclusion, namely, the discovery of an economic ore deposit.

On the Genrico Nickel property the geological work referred to in the Chairman's Review is almost completed and drilling is expected to start in the next month to six weeks. I would like to emphasize that the drilling programmes are so extensive that full information will not be available until the cores already recovered and to be recovered have been assayed over their whole length. In this way a comprehensive picture of the drilling results can be obtained and a true and proper assessment made. It is our intention, therefore, to issue a progress report when this work has been completed and at the same time we hope it

will be possible to indicate preliminary figures for the present financial year which ends on September 30 next.

Your Company's interests in Ghana continue to show satisfactory progress and I am able to report that the mining expert, Mr. G. C. Monture, brought out by the Ghana Government to examine the mining industry with a view to proposing subsidy legislation is now at work on the properties in which your Company has a substantial interest.

The report and accounts were adopted.

EAST RAND CONSOLIDATED

MR. C. J. BURNS' STATEMENT

The thirty-second annual general meeting of East Rand Consolidated, Ltd., was held on July 21 in London.

Mr. C. J. Burns, Chairman, presided and the following is an extract from his circulated Statement:—

The profit for the year ended December 31, 1957, was £62,866 which was an increase of £4,629 over the previous year. A dividend of 6½% has again been recommended. These results would undoubtedly have been better but for the marked deterioration which took place in world trade in the closing months of 1957.

Our Johannesburg Office continues to manage the Southern African aspect of our business, with particular reference to our interests in gold and base metal mining in that part. I again visited South Africa and Southern Rhodesia at the end of the year in order to continue the close liaison we have with our overseas personnel. I also visited the Witwatersrand Nigel mine. The main task of this property at present is to accelerate development from the drive connecting the old No. 1 shaft and the new No. 3 shaft, in order to obtain the expected economies in working costs as soon as practicable. In the meantime, the additional development costs are being charged against current profits.

Chairman's Additional Remarks

During the course of his address at the meeting, the Chairman said: As far as can be estimated at present, our investment income for the present year should show some useful increase on that for 1957, occasioned largely by the re-entry into the Dividend list of Witwatersrand Nigel Limited, recently with a Dividend of 5%. Income from share dealing is always problematical and it would be unwise of me at this stage to forecast an estimate of our profits from this source, but we have traded satisfactory in this respect so far this year.

The report and accounts were adopted and the dividend was approved.

Holman Brothers.—Holman Brothers' results in the year to March 31 last — their first as a public company — were by no means unsatisfactory in view of the difficult trading conditions experienced. Net taxed profit attributable to the parent company was £217,825 (1957: £259,756) from which dividends totalling 12 per cent have been declared. The chairman, Mr. A. T. Holman, says that drastic streamlining of the organization has taken place during the past year, putting Holmans in a sound position to take advantage of any improvement in economic conditions.

Metal and Mineral Trades

Established 1797

Members of the London Metal Exchange

DERBY & CO. LTD.

11-12 ST. SWITHIN'S LANE, E.C.4.

Telephone: MINCING LANE 5272

Specialists in

WOLFRAM, SCHEELITE, CHROME, MOLYBDENITE, TANTALITE, COLUMBITE
RUTILE, ILMENITE, BERYL, ZIRCON AND OTHER MINERALS

Smelters and Refiners of

GOLD, SILVER, PLATINUM, PALLADIUM, OSMIUM, IRIIDIUM, ETC.

Buyers of

MINERALS, ORES, CONCENTRATES, SWEEPS, LEMELS AND RESIDUES
containing GOLD, SILVER, PLATINUM, COPPER, TIN, ZINC, LEAD

Works:

BRIMSDOWN, MIDDLESEX

Also at:

NEW YORK
JOHANNESBURG
SALISBURY (Rhodesia)
ADELAIDE :: SYDNEY

MEMBERS OF THE LONDON METAL EXCHANGE

LEONARD COHEN LTD.

PRECIOUS METALS

ELECTROLYTIC COPPER WIREBARS & CATHODES
TIN — LEAD — ZINC
NON-FERROUS METAL INGOTS
ORES — CONCENTRATES — SCRAP METALS

London Office:

1 HAY HILL, W.1
Telephone: GROSVENOR 6284

Works:

PORTH, GLAM.
Telephone: PORTH 289

ENTORES, LIMITED

CITY WALL HOUSE, 14-24, FINSBURY STREET,
LONDON, E.C.2.

**NON-FERROUS METALS
ORES · RESIDUES**

Telegrams:
Entores, Phone, London

Telephone:
MONarch 6050

Telex No:
London 28455

GEORGE T. HOLLOWAY Co. Ltd.

Metallurgists & Assayers

ORE TESTING, WORKS AND METALLURGICAL
RESEARCH LABORATORIES

Atlas Road, Victoria Road, Acton,
LONDON, N.W.10

Telephone:
ELGAR 5202

Grams and Cables:
NEOLITHIC LONDON

EVERITT & Co. Ltd.

40 CHAPEL STREET
LIVERPOOL

Tele. Address: Persistent, Liverpool

Phone: 2995 Central

SPECIALITY

MANGANESE PEROXIDE ORES,

We are buyers of:—

WOLFRAM, SCHEELITE, MOLYBDENITE
VANADIUM, ILMENITE, RUTILE,
ZIRCONIUM and TANTALITE ORES

Suppliers of:—

FERRO-ALLOYS & METALS NON-FERROUS ALLOYS

CONSOLIDATED TIN SMELTERS, LIMITED

ST. SWITHIN'S HOUSE

11/12 ST. SWITHIN'S LANE, LONDON, E.C.4.

TELEPHONE: MANSION HOUSE 2164/2168 TELEGRAMS: CONSMELTER PHONE LONDON

Buyers of all classes of Tin Ores

Proprietors of the following Brands of Tin:

STRAITS

INGOTS—E. S. COY LTD., PENANG

BARS—PENANG PALM

produced by

EASTERN SMELTING CO. LIMITED,

P.O. BOX 280, PENANG,
Federation of Malaya

ENGLISH (*Lamb and Flag*)

INGOTS CORNISH } *Common*
AND—MELLANEAR } *and*
BARS PENPOLL } *Refined*

MELLANEAR 99.9% Guaranteed
MELLANEAR U.S.A. Grade A

produced by

WILLIAMS, HARVEY & CO. LIMITED
BOOTLE, 20, Lancashire

SOLE SELLING AGENTS:

VIVIAN, YOUNGER & BOND LTD

PRINCES HOUSE, 95 GRESHAM STREET, LONDON, E.C.2.

TELEPHONE: MONARCH 7221-7 · TELEGRAMS: BOND STOCK, LONDON · TELEX: LONDON 8665 · CABLES: BOND, LONDON

METAL TRADERS LTD.

7 GRACECHURCH ST., LONDON, E.C.3

Telegrams: Serolatam, Stock, London

Telex No: London 22610

Telephone: MANSION House 2544

Buyers and Sellers of
**NON-FERROUS METALS
ORES AND MINERALS**

New York Associates:
Metal Traders Inc., 26 Broadway

BROOKSIDE METAL CO. LTD.

(Owned by Metal Traders Ltd.)

WATFORD FOUNDRY, BY-PASS ROAD,
WATFORD, HERTS.

Telegrams: Brookside, Watford, Telex.

Telephone: Watford 6474

Buyers and Sellers of
NON-FERROUS SCRAP METALS

Specialists in
COPPER-BEARING MATERIALS

**MINING &
CHEMICAL
PRODUCTS
LIMITED**

**86 Strand
London WC2
Telephone
Covent Garden
3393**

**Buyers of Ores,
Concentrates
and Residues of**

**BISMUTH
INDIUM
SELENIUM**

International Smelters and Buyers of

**NON-FERROUS
SCRAP METALS
RESIDUES**

TIN
LEAD
WHITEMETAL
SOLDER
GUNMETAL
COPPER

THE EYRE SMELTING CO LTD

Tandem Works, Merton Abbey, London, S.W.19

Phone: Mitcham 2031

Wire: Eyresmeltin, Phone, London

we buy
CONCENTRATES
ORES RESIDUES

containing
Base and Precious
METALS

JACOB METALS LTD.

**GREENWICH HOUSE, 10-13 NEWGATE ST.,
LONDON, E.C.1**

Telephone: CITY 8401 (7 lines) Cables: METALJACOB LONDON
Telex No: LONDON 2-8655

FRANK & SCHULTE

Handelsgesellschaft m.b.H.
(Incorporating Frank & Dieckmann G.m.b.H.)
ALFREDSTRASSE 152 POSTBOX 515
ESSEN, GERMANY
Telegrams: Silizium Teleprinter No. 0857835 Telephone: 44001
ORES MINERALS FERRO-ALLOYS
METAL-ALLOYS METALS
CHEMICALS REFRACTORIES
SELENIUM and ROCK CRYSTAL
Established 1922
OFFERS AND AGENCIES SOLICITED

J. LOWENSTEIN & CO. LTD.

GREENWICH HOUSE,
10/13 NEWGATE STREET, LONDON, E.C.1
Telephone: City 8401 (7 lines)
ORES - METALS - RESIDUES

CUPELS

MAGNESIA CUPELS and ASSAY MATERIAL
"MABOR" BRAND, as supplied to MINTS,
MINES and ASSAYERS throughout the World.
MABOR (1944) LIMITED
(Founded 1906)
THE PIONEERS OF MAGNESIA CUPELS
Registered Office: 310 Winchester House, London, E.C.2
Phone: London Wall 5089 Tel. Address: Maborlim, London
Agencies: SALEM, INDIA: MONTREAL, CANADA:
PERTH, W.A.
Supplies through Agents, the Trade, or direct

ZINC SHAVINGS GRANULATED & POWDERED NON-FERROUS METALS

"Lead Wool" for Pipe-jointing.
Metallic Packing for Pumps, etc.

THE LEAD WOOL CO. LTD
SNODLAND - KENT

Telephone: Snodland 516/7 Telegrams: "Strength, Phone, Snodland"

Cables: Alreco, London Telephone: Trafalgar 59223 (8 lines) Telex: 2-2462

ALRECO METAL CORPORATION LTD.

(Members of the London Metal Exchange)

ORES :: MINERALS

RESIDUES METAL ALLOYS

SEMI-FINISHED

NON-FERROUS METAL PRODUCTS

1-3 ROBERT STREET, LONDON, W.C.2.
OFFICES AT NEW YORK AND BRUSSELS

CHARLES KERRIDGE

● SCRAP LEAD ● BATTERY PLATES
● COPPER CABLES ● NON-FERROUS CONTENT
FENCEPIECE ROAD, CHIGWELL, ESSEX
Telephones: Hainault 2903 Larkwood 3863 Telegrams: Metallia East Phone London

Heneage Metals Ltd.

FOR *Quality* INGOTS IN

BRASS, GUN METAL & PHOSPHOR-BRONZE

244-5 HENEAGE ST • BIRMINGHAM 7 • ASTON CROSS 1177/8

DEERING PRODUCTS LTD.

8 GREAT SMITH STREET, LONDON, S.W.1

**ORES - MINERALS - REFRACTORY
RAW MATERIALS**

Telephone: ABBEY 2681/2 Telex 23336 PRODEERING, LONDON Cables:



★ **MINERALS**
★ **METALS**
★ **ORES**
of every description

J.C. Gilbert Ltd

COLUMBIA HOUSE, ALDWYCH, LONDON, W.C.2.

AGENTS IN MOST COUNTRIES THROUGHOUT THE WORLD



**Underground or Surface
Whatever the Load
Whatever the Distance**

Left: CABLE BELT rope driven conveyor. Length 7,500 feet, Lift 220 feet, 42 in. Belt at 350 ft./min. handling 600 tons/hour of R.O.M. Coal.

Photograph by permission of the National Coal Board, East Midlands Division, Bestwood Colliery.

Right: CABLE BELT rope driven conveyor. Length 7,260 feet, Lift 300 feet, 24 in. Belt at 200 feet/minute, handling 200 tons/hour of chalk.

Photograph by permission of the Associated Portland Cement Manufacturing Company Limited.

thousands of trouble-free tons with

CABLE BELT

ROPE DRIVEN

CONVEYORS

*Already installed and to be installed
in Great Britain, Canada, France,
South Africa, Australia, Japan and
the Belgian Congo*



LONGMAN INDUSTRIAL ESTATE,
INVERNESS, SCOTLAND

Telephone: Inverness 2761-2 Telegrams: Cablebelt, Inverness

